

## Pantheon Report

Generated at 2017-12-20 17:49:42 (UTC).

Data path: AWS Brazil 2 Ethernet (*local*) → Colombia ppp0 (*remote*).

Repeated the test of 14 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

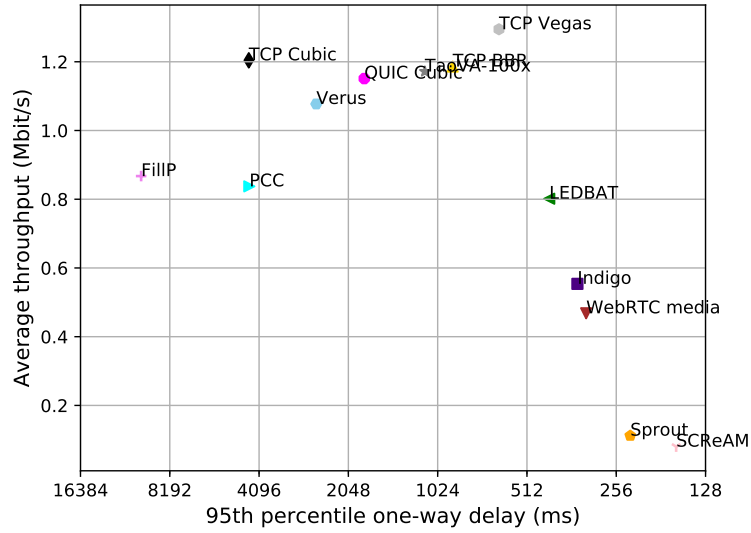
Tested BBR with qdisc of Fair Queuing (*fq*), and other schemes with the default Linux qdisc (*pfifo\_fast*).

NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

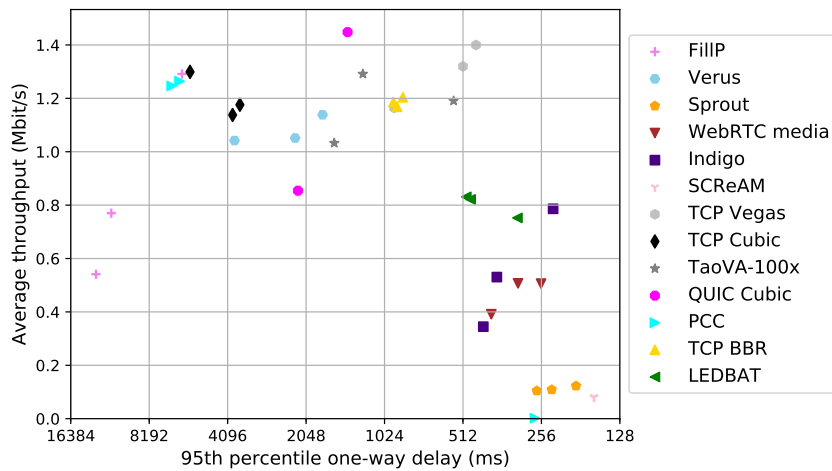
Git summary:

```
branch: master @ 904a5750834816b1e46a2c86405d707788d27c16
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ dcaef6b00654e660f73f7ed679d2eab61ce08639
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quick @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme



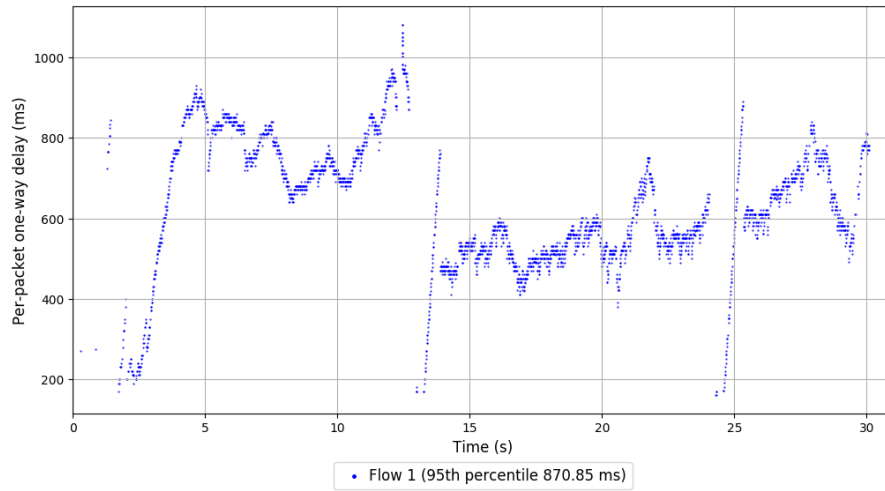
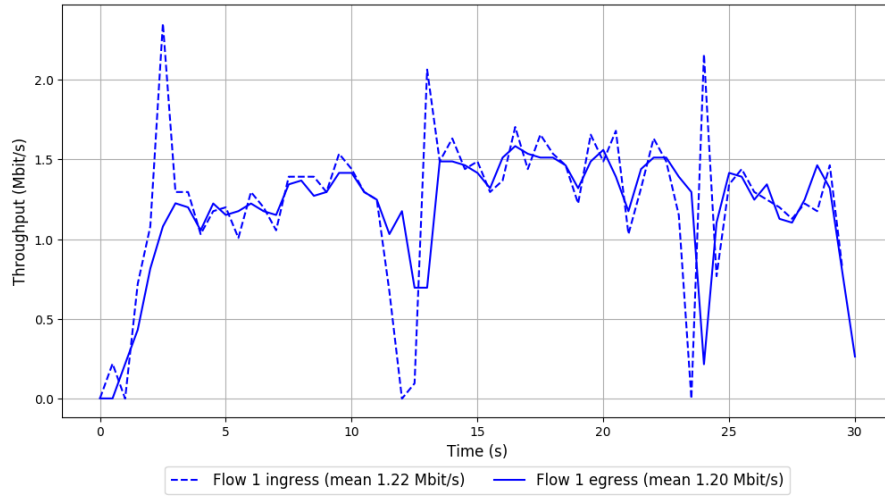
| scheme       | # runs | mean avg tput (Mbit/s) | mean 95th-%ile delay (ms) | mean loss rate (%) |
|--------------|--------|------------------------|---------------------------|--------------------|
|              |        | flow 1                 | flow 1                    | flow 1             |
| TCP BBR      | 3      | 1.19                   | 911.20                    | 1.92               |
| TCP Cubic    | 3      | 1.21                   | 4436.22                   | 17.95              |
| LEDBAT       | 3      | 0.80                   | 430.77                    | 0.49               |
| PCC          | 3      | 0.84                   | 4417.38                   | 58.85              |
| QUIC Cubic   | 2      | 1.15                   | 1810.12                   | 4.96               |
| SCReAM       | 3      | 0.08                   | 160.81                    | 0.13               |
| WebRTC media | 3      | 0.47                   | 323.39                    | 0.27               |
| Sprout       | 3      | 0.11                   | 229.64                    | 0.35               |
| TaoVA-100x   | 3      | 1.17                   | 1131.02                   | 1.01               |
| TCP Vegas    | 3      | 1.29                   | 636.35                    | 0.31               |
| Verus        | 3      | 1.08                   | 2626.99                   | 7.85               |
| Copa         | 0      | N/A                    | N/A                       | N/A                |
| FillP        | 3      | 0.87                   | 10232.29                  | 97.33              |
| Indigo       | 3      | 0.55                   | 346.08                    | 0.11               |

Run 1: Statistics of TCP BBR

Start at: 2017-12-20 16:58:25  
End at: 2017-12-20 16:58:55  
Local clock offset: -0.024 ms  
Remote clock offset: 16.125 ms

# Below is generated by plot.py at 2017-12-20 17:49:15  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.20 Mbit/s  
95th percentile per-packet one-way delay: 870.845 ms  
Loss rate: 1.90%  
-- Flow 1:  
Average throughput: 1.20 Mbit/s  
95th percentile per-packet one-way delay: 870.845 ms  
Loss rate: 1.90%

### Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2017-12-20 17:16:07

End at: 2017-12-20 17:16:37

Local clock offset: -0.09 ms

Remote clock offset: 15.764 ms

# Below is generated by plot.py at 2017-12-20 17:49:15

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 916.503 ms

Loss rate: 2.09%

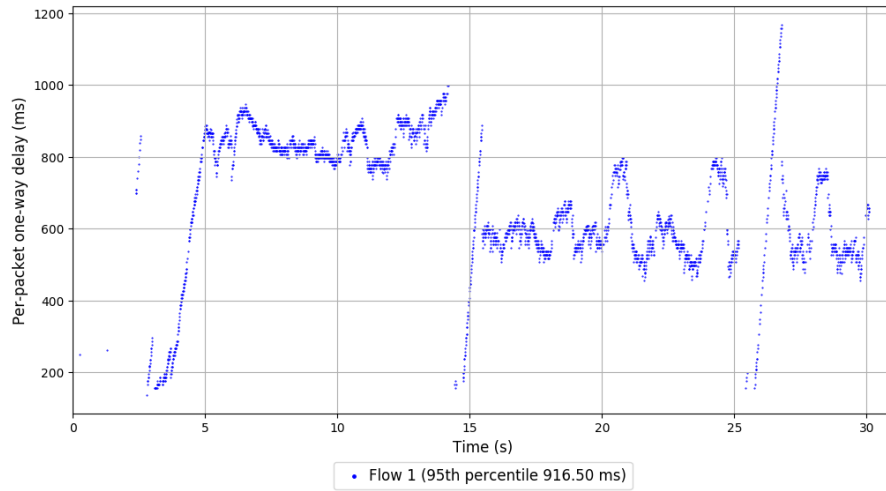
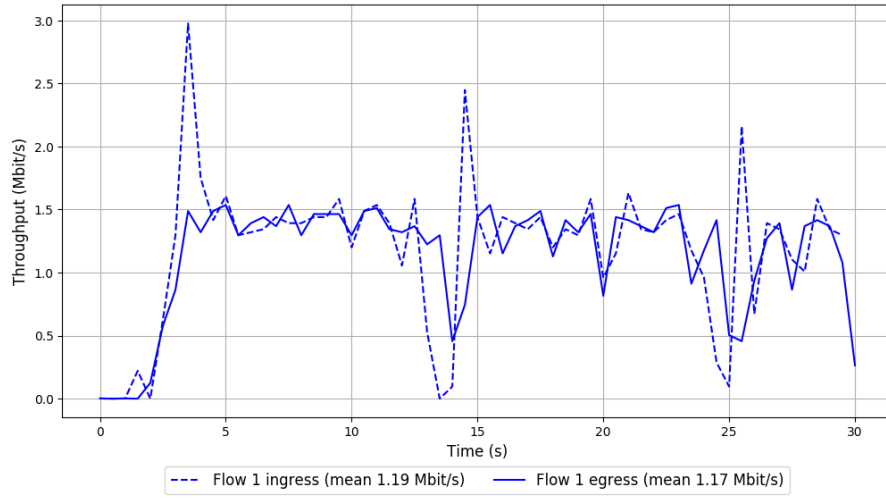
-- Flow 1:

Average throughput: 1.17 Mbit/s

95th percentile per-packet one-way delay: 916.503 ms

Loss rate: 2.09%

## Run 2: Report of TCP BBR — Data Link



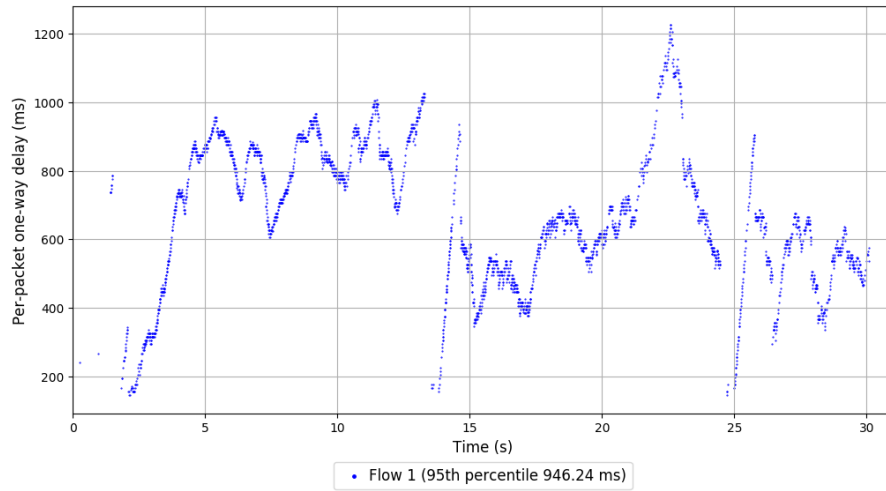
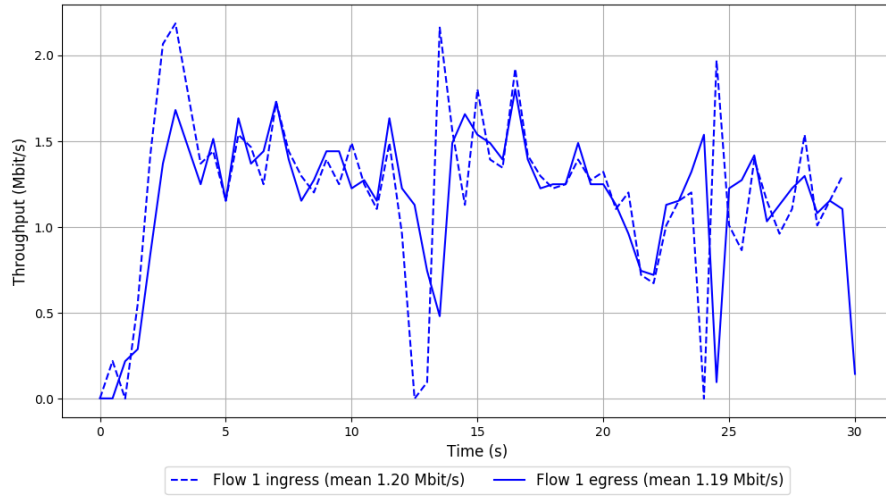
Run 3: Statistics of TCP BBR

Start at: 2017-12-20 17:33:45  
End at: 2017-12-20 17:34:15  
Local clock offset: -0.025 ms  
Remote clock offset: 15.687 ms

# Below is generated by plot.py at 2017-12-20 17:49:16  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.19 Mbit/s  
95th percentile per-packet one-way delay: 946.244 ms  
Loss rate: 1.76%  
-- Flow 1:  
Average throughput: 1.19 Mbit/s  
95th percentile per-packet one-way delay: 946.244 ms  
Loss rate: 1.76%



### Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2017-12-20 17:09:03

End at: 2017-12-20 17:09:33

Local clock offset: -0.041 ms

Remote clock offset: 16.18 ms

# Below is generated by plot.py at 2017-12-20 17:49:16

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.18 Mbit/s

95th percentile per-packet one-way delay: 3676.007 ms

Loss rate: 13.39%

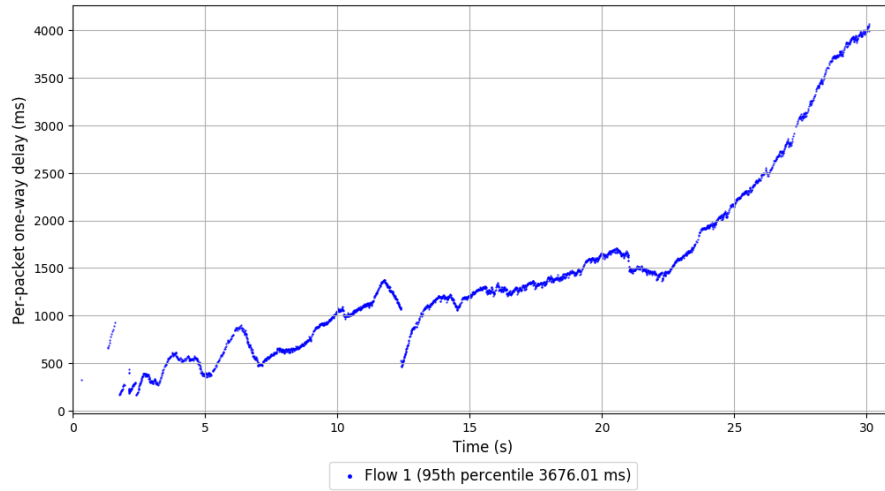
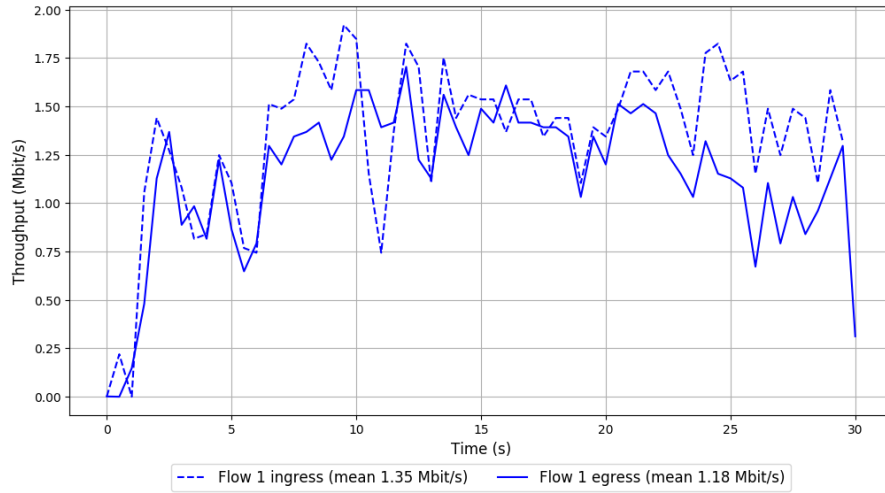
-- Flow 1:

Average throughput: 1.18 Mbit/s

95th percentile per-packet one-way delay: 3676.007 ms

Loss rate: 13.39%

### Run 1: Report of TCP Cubic — Data Link

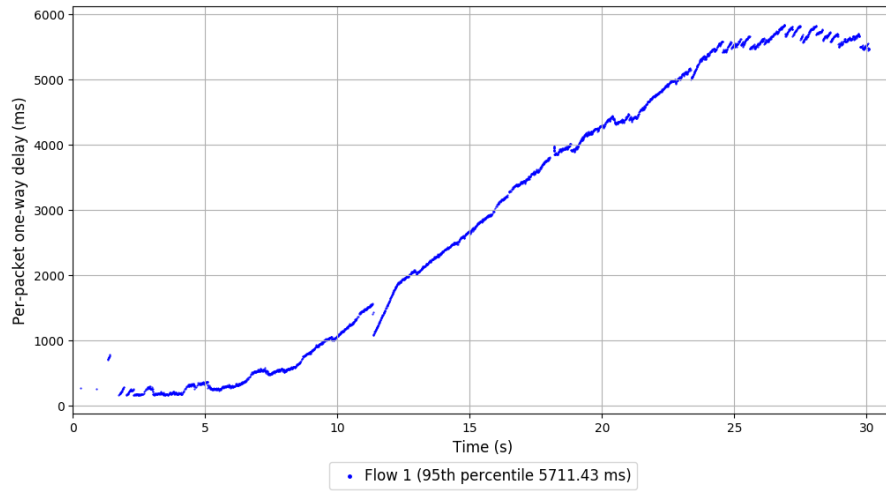
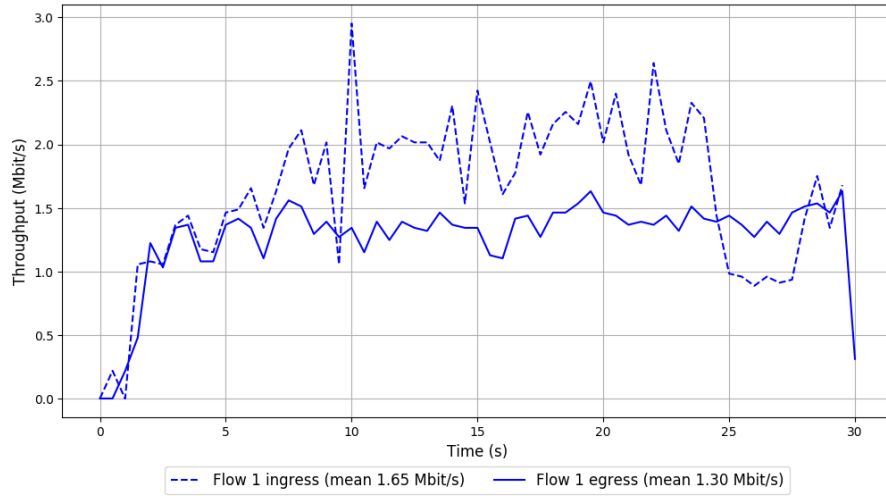


Run 2: Statistics of TCP Cubic

Start at: 2017-12-20 17:26:42  
End at: 2017-12-20 17:27:12  
Local clock offset: -0.021 ms  
Remote clock offset: 15.971 ms

# Below is generated by plot.py at 2017-12-20 17:49:17  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.30 Mbit/s  
95th percentile per-packet one-way delay: 5711.430 ms  
Loss rate: 21.63%  
-- Flow 1:  
Average throughput: 1.30 Mbit/s  
95th percentile per-packet one-way delay: 5711.430 ms  
Loss rate: 21.63%

## Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2017-12-20 17:44:21

End at: 2017-12-20 17:44:51

Local clock offset: -0.023 ms

Remote clock offset: 9.934 ms

# Below is generated by plot.py at 2017-12-20 17:49:17

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.14 Mbit/s

95th percentile per-packet one-way delay: 3921.235 ms

Loss rate: 18.83%

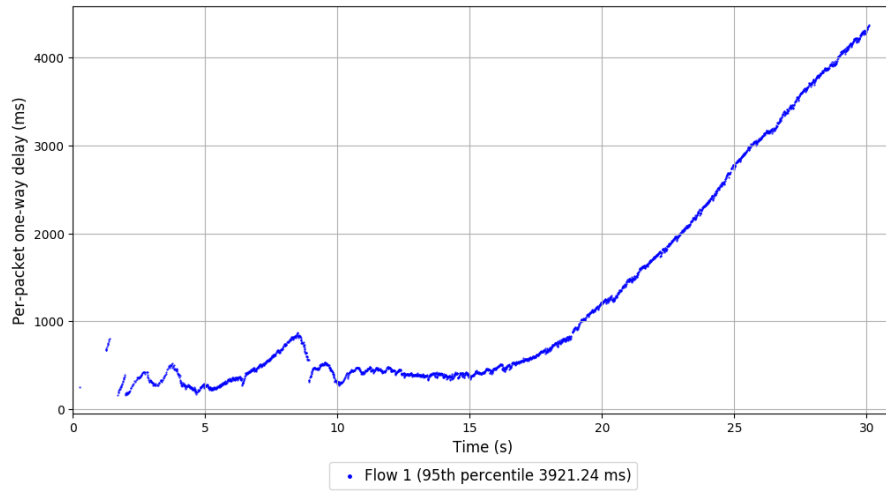
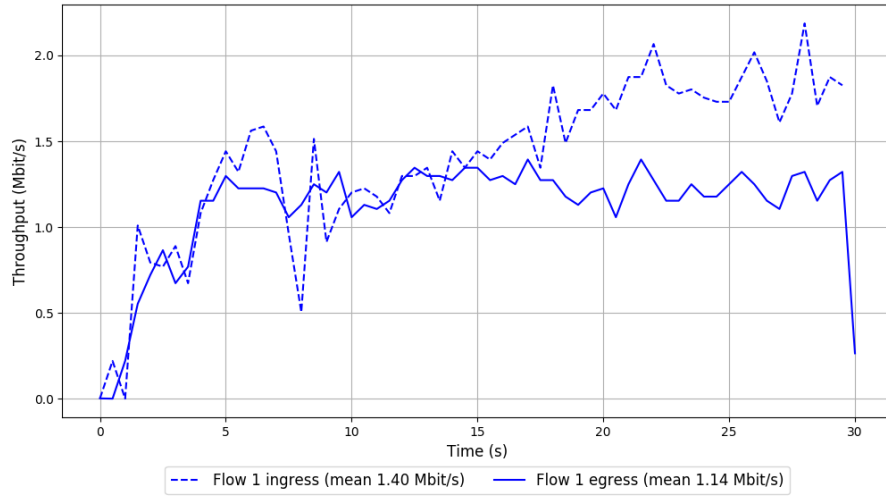
-- Flow 1:

Average throughput: 1.14 Mbit/s

95th percentile per-packet one-way delay: 3921.235 ms

Loss rate: 18.83%

### Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of LEDBAT

Start at: 2017-12-20 17:11:24

End at: 2017-12-20 17:11:54

Local clock offset: -0.03 ms

Remote clock offset: 15.714 ms

# Below is generated by plot.py at 2017-12-20 17:49:17

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.75 Mbit/s

95th percentile per-packet one-way delay: 316.497 ms

Loss rate: 0.63%

-- Flow 1:

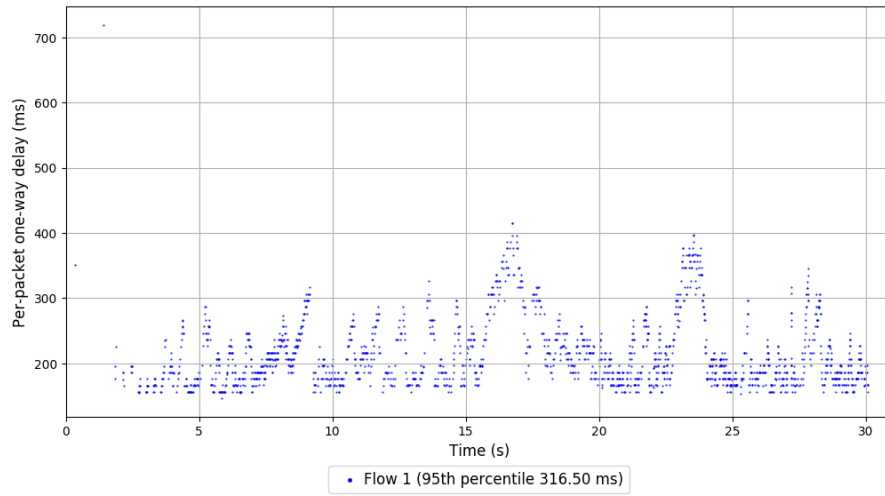
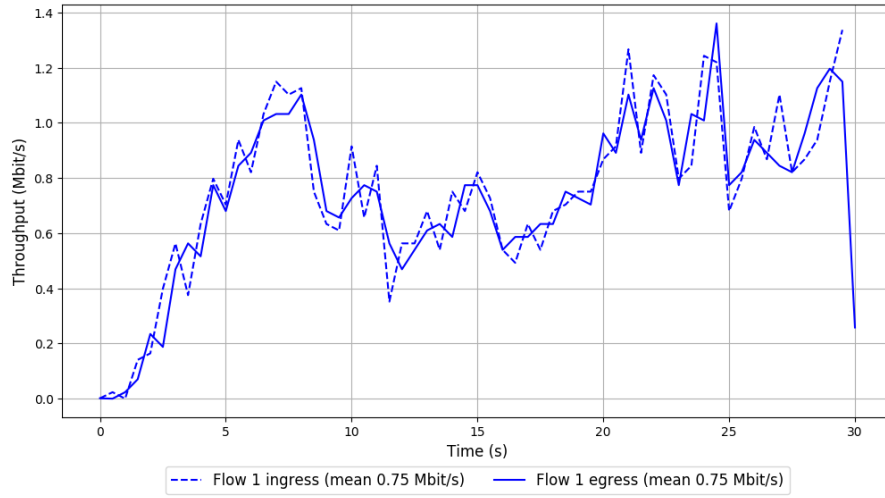
Average throughput: 0.75 Mbit/s

95th percentile per-packet one-way delay: 316.497 ms

Loss rate: 0.63%



# Run 1: Report of LEDBAT — Data Link

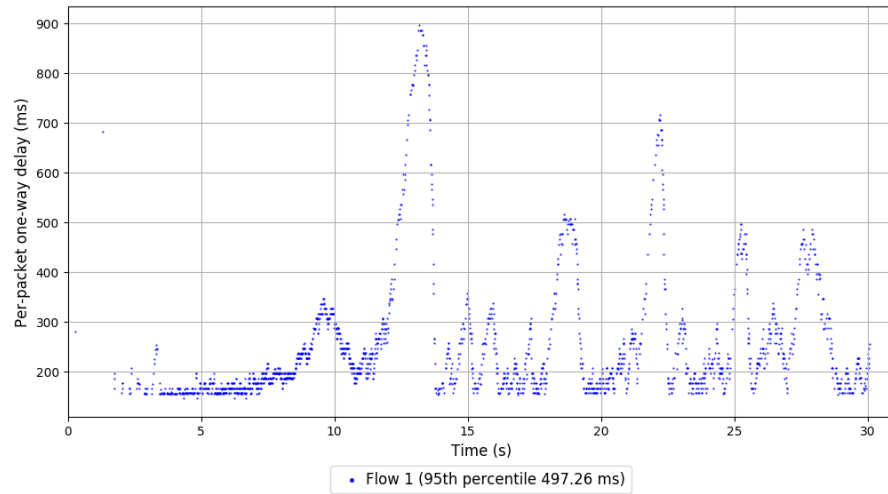
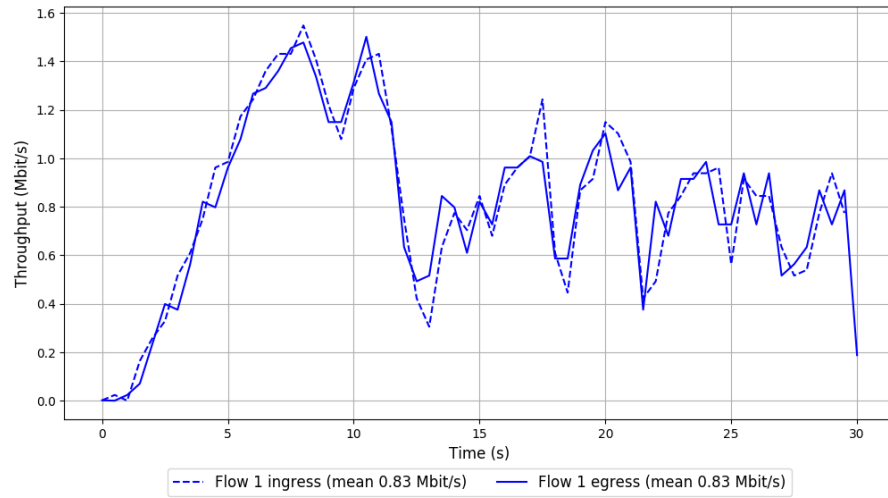


Run 2: Statistics of LEDBAT

Start at: 2017-12-20 17:29:03  
End at: 2017-12-20 17:29:33  
Local clock offset: -0.027 ms  
Remote clock offset: 15.693 ms

# Below is generated by plot.py at 2017-12-20 17:49:17  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.83 Mbit/s  
95th percentile per-packet one-way delay: 497.258 ms  
Loss rate: 0.42%  
-- Flow 1:  
Average throughput: 0.83 Mbit/s  
95th percentile per-packet one-way delay: 497.258 ms  
Loss rate: 0.42%

## Run 2: Report of LEDBAT — Data Link

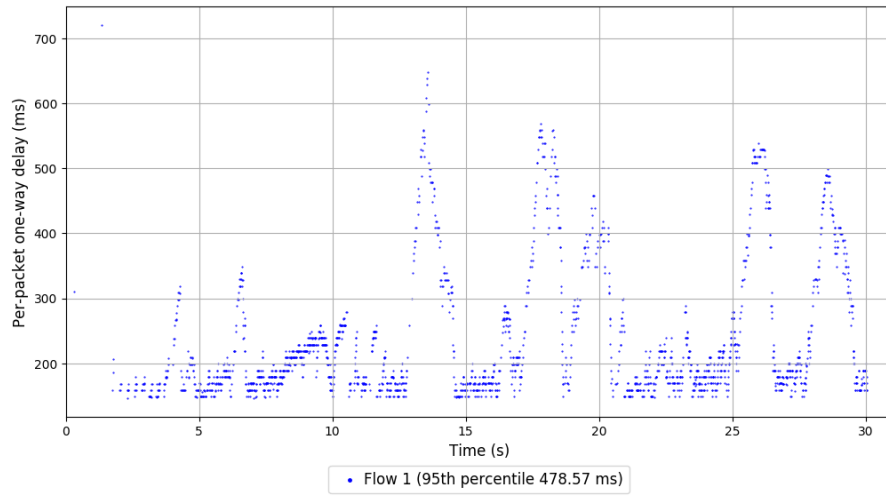
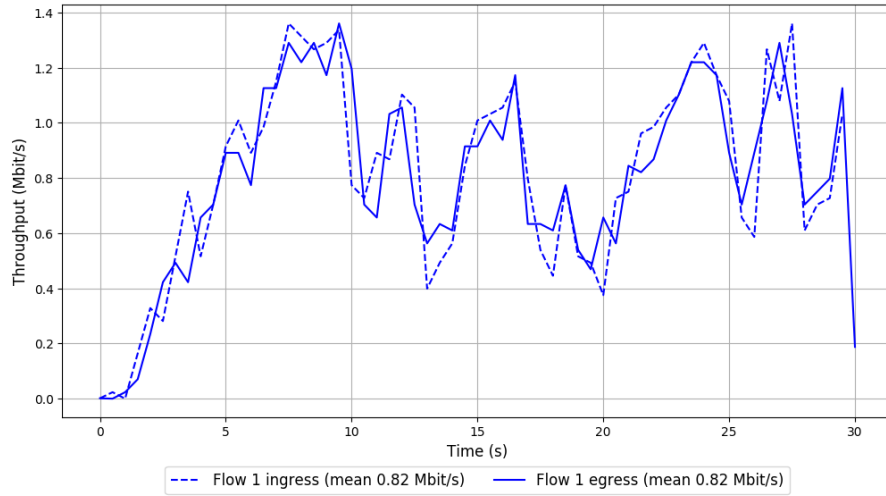


Run 3: Statistics of LEDBAT

Start at: 2017-12-20 17:46:41  
End at: 2017-12-20 17:47:11  
Local clock offset: -0.019 ms  
Remote clock offset: 14.666 ms

# Below is generated by plot.py at 2017-12-20 17:49:19  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.82 Mbit/s  
95th percentile per-packet one-way delay: 478.568 ms  
Loss rate: 0.43%  
-- Flow 1:  
Average throughput: 0.82 Mbit/s  
95th percentile per-packet one-way delay: 478.568 ms  
Loss rate: 0.43%

### Run 3: Report of LEDBAT — Data Link



Run 1: Statistics of PCC

Start at: 2017-12-20 17:03:08

End at: 2017-12-20 17:03:38

Local clock offset: -0.016 ms

Remote clock offset: 9.555 ms

# Below is generated by plot.py at 2017-12-20 17:49:28

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.25 Mbit/s

95th percentile per-packet one-way delay: 6715.599 ms

Loss rate: 90.38%

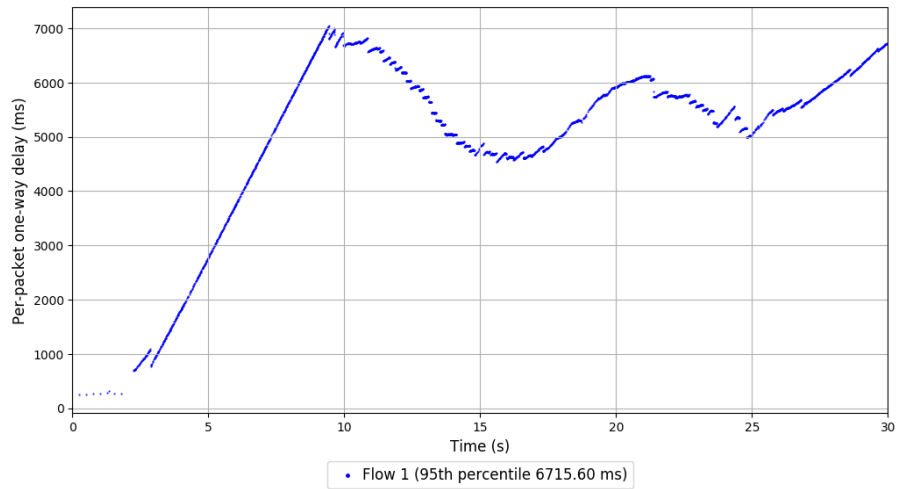
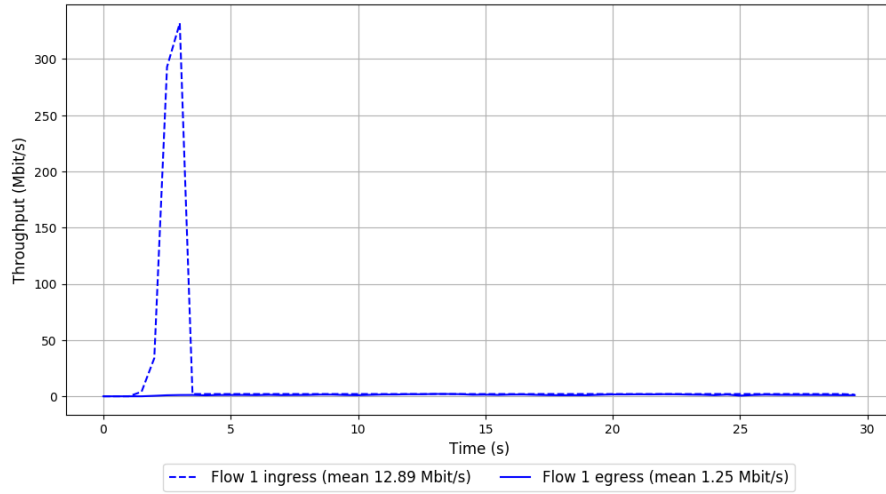
-- Flow 1:

Average throughput: 1.25 Mbit/s

95th percentile per-packet one-way delay: 6715.599 ms

Loss rate: 90.38%

### Run 1: Report of PCC — Data Link



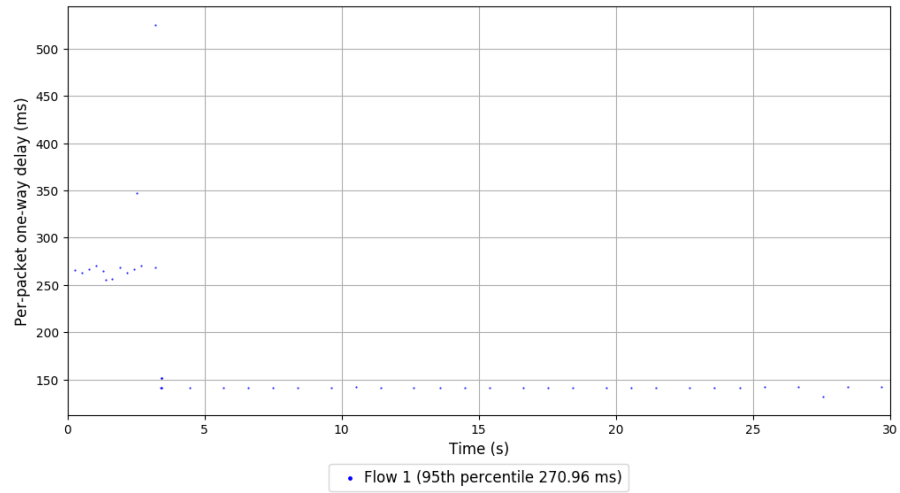
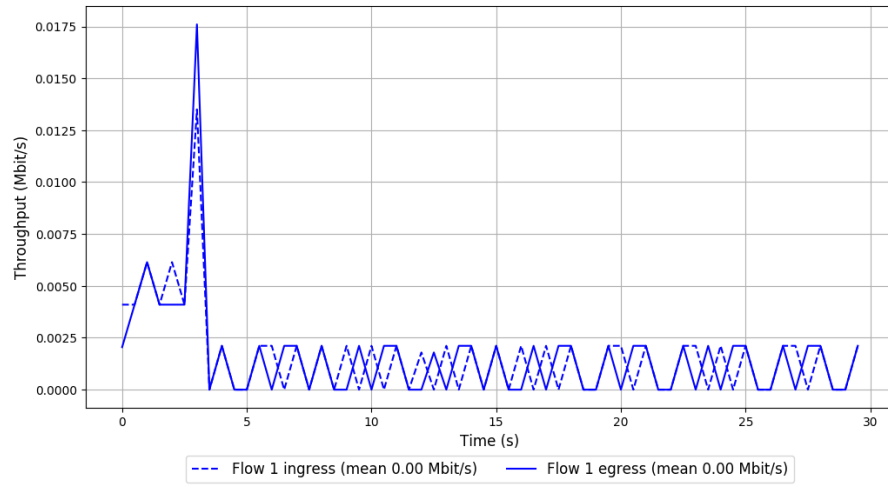
Run 2: Statistics of PCC

Start at: 2017-12-20 17:20:49  
End at: 2017-12-20 17:21:19  
Local clock offset: -0.088 ms  
Remote clock offset: 10.903 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 270.964 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 270.964 ms  
Loss rate: 0.00%



## Run 2: Report of PCC — Data Link

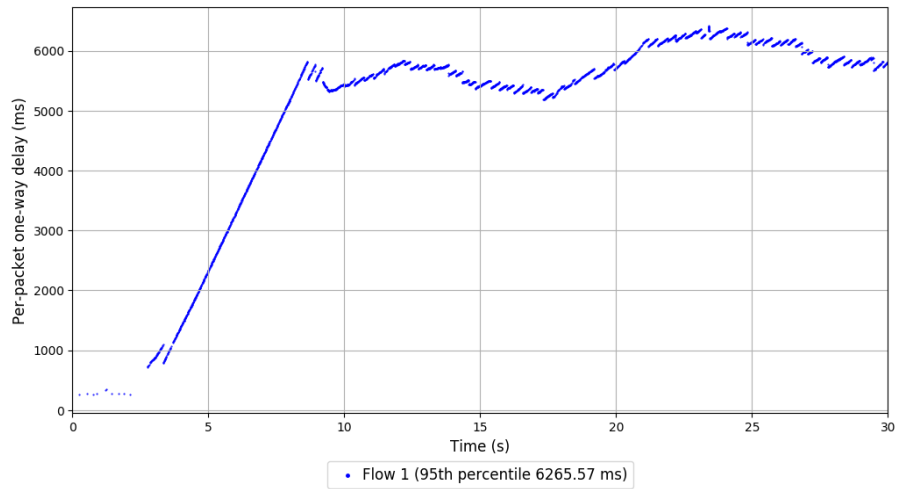
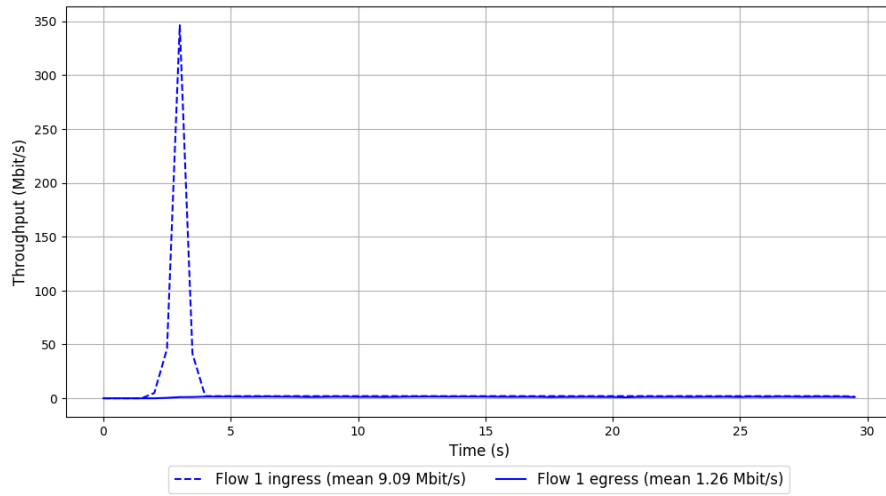


Run 3: Statistics of PCC

Start at: 2017-12-20 17:38:28  
End at: 2017-12-20 17:38:58  
Local clock offset: -0.103 ms  
Remote clock offset: 15.728 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.26 Mbit/s  
95th percentile per-packet one-way delay: 6265.567 ms  
Loss rate: 86.17%  
-- Flow 1:  
Average throughput: 1.26 Mbit/s  
95th percentile per-packet one-way delay: 6265.567 ms  
Loss rate: 86.17%

### Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2017-12-20 17:12:34

End at: 2017-12-20 17:13:04

Local clock offset: -0.019 ms

Remote clock offset: 10.885 ms

# Below is generated by plot.py at 2017-12-20 17:49:28

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 1419.488 ms

Loss rate: 5.00%

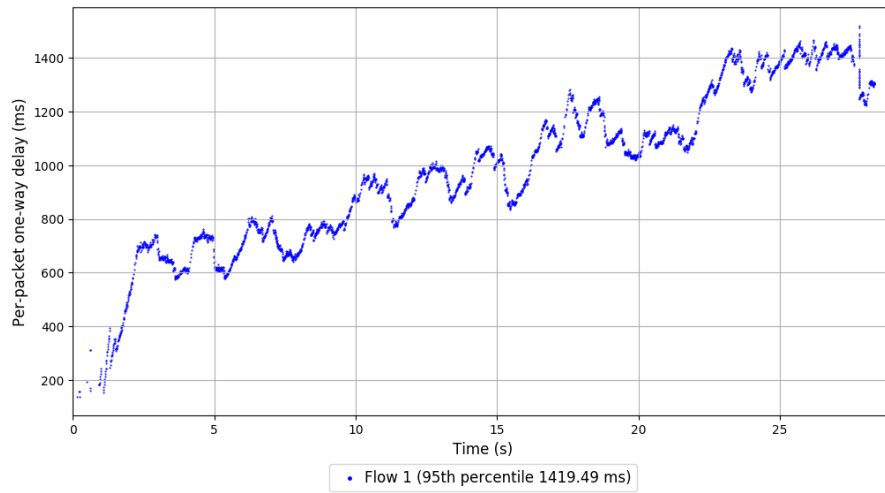
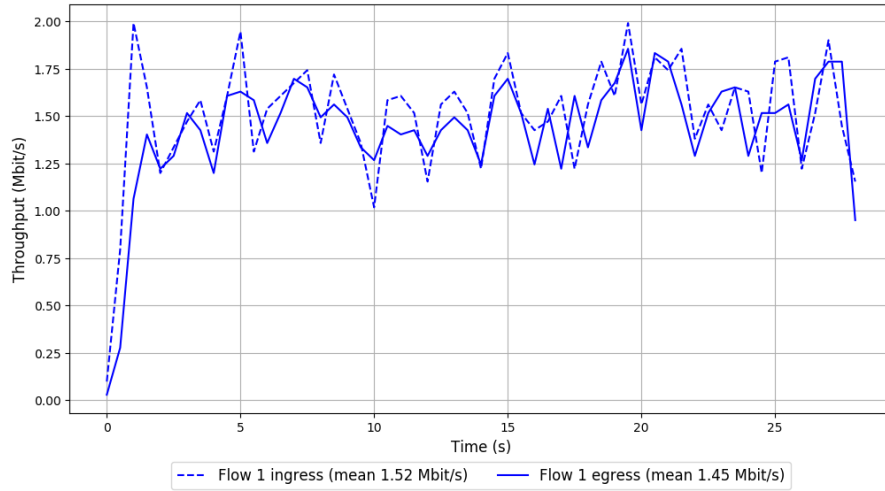
-- Flow 1:

Average throughput: 1.45 Mbit/s

95th percentile per-packet one-way delay: 1419.488 ms

Loss rate: 5.00%

### Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2017-12-20 17:30:13

End at: 2017-12-20 17:30:43

Local clock offset: -0.022 ms

Remote clock offset: 10.026 ms

# Below is generated by plot.py at 2017-12-20 17:49:28

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.85 Mbit/s

95th percentile per-packet one-way delay: 2200.761 ms

Loss rate: 4.93%

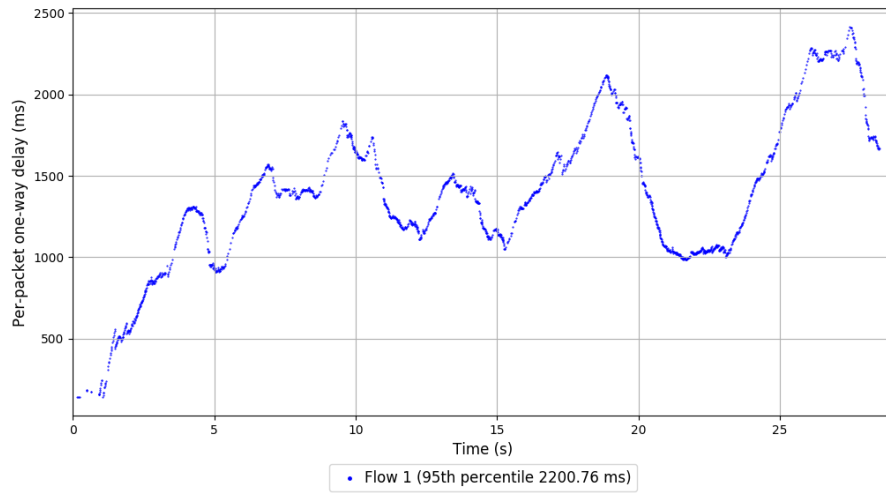
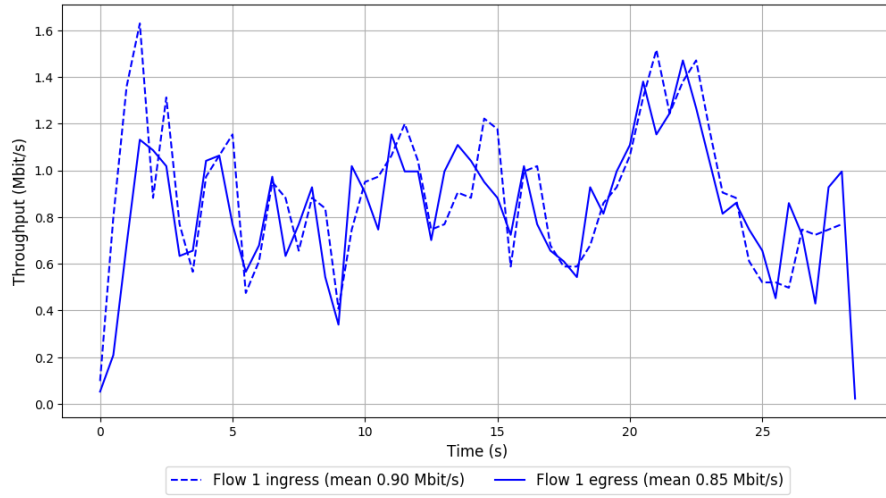
-- Flow 1:

Average throughput: 0.85 Mbit/s

95th percentile per-packet one-way delay: 2200.761 ms

Loss rate: 4.93%

## Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2017-12-20 17:47:51

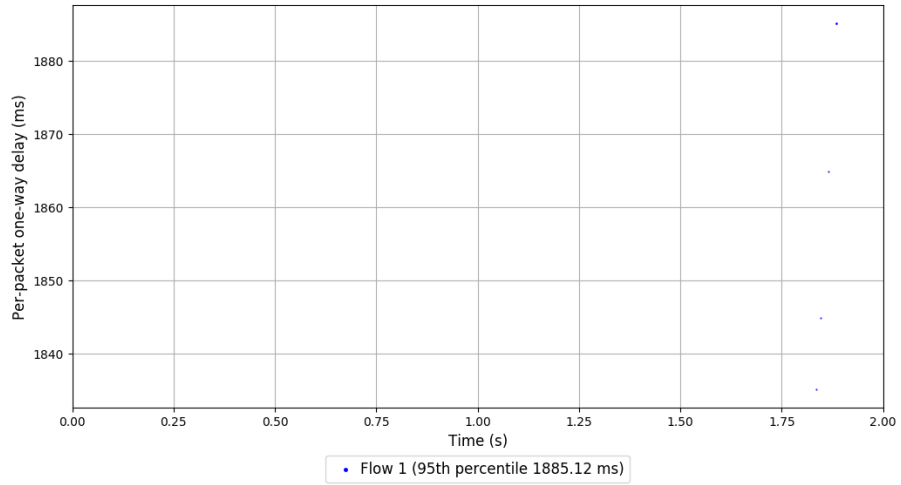
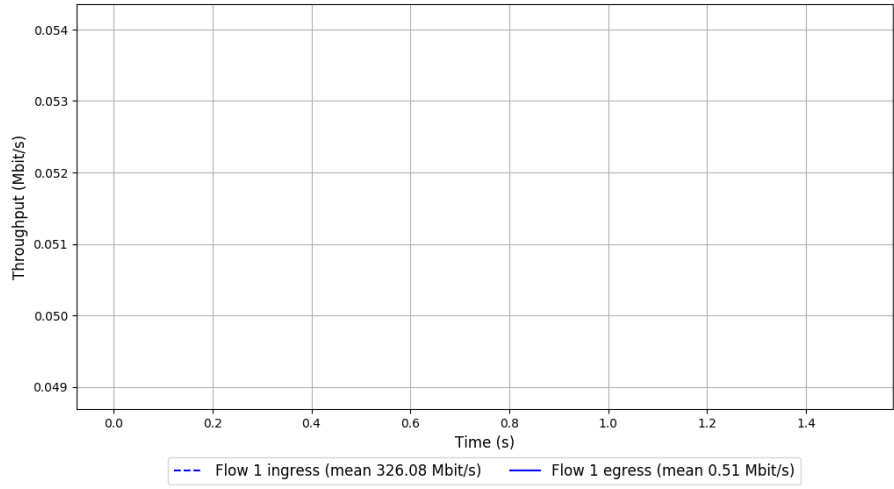
End at: 2017-12-20 17:48:21

Local clock offset: -0.04 ms

Remote clock offset: 14.781 ms



### Run 3: Report of QUIC Cubic — Data Link

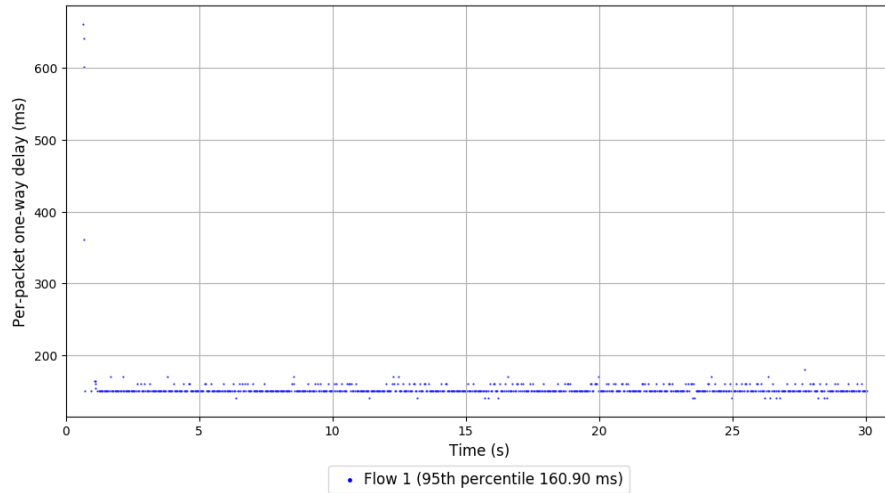
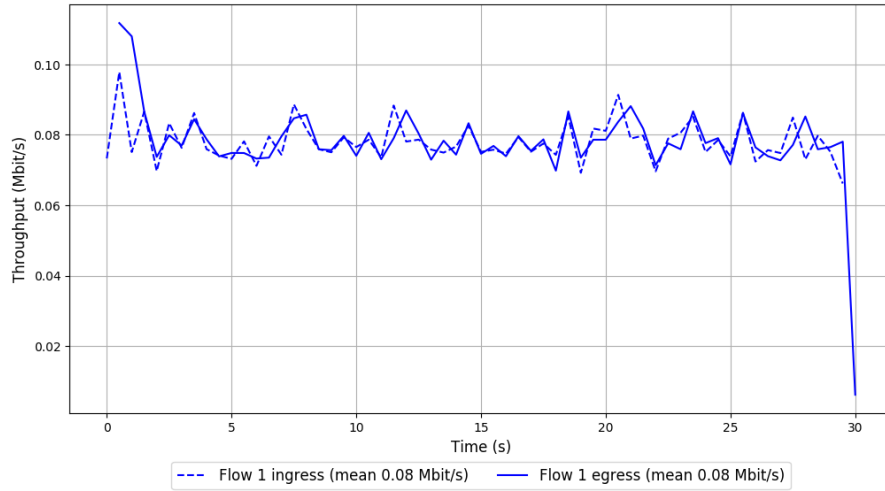


Run 1: Statistics of SCReAM

Start at: 2017-12-20 17:10:13  
End at: 2017-12-20 17:10:43  
Local clock offset: -0.011 ms  
Remote clock offset: 15.762 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 160.895 ms  
Loss rate: 0.13%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 160.895 ms  
Loss rate: 0.13%

### Run 1: Report of SCReAM — Data Link

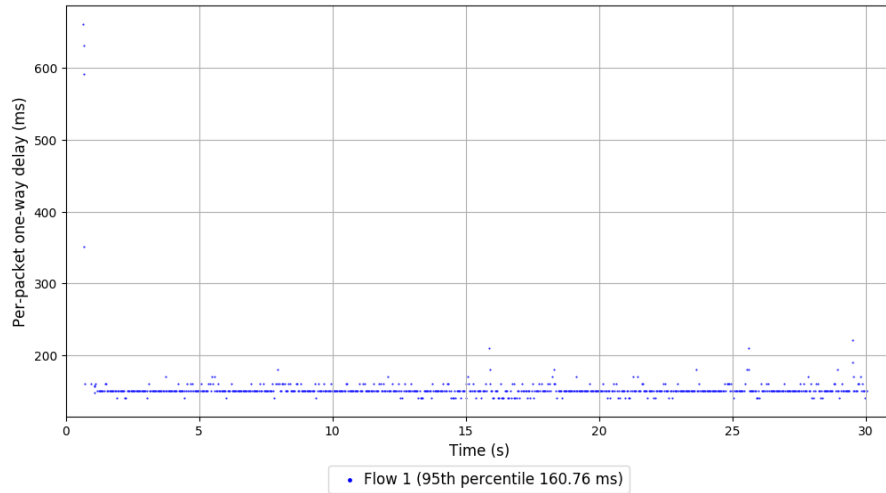
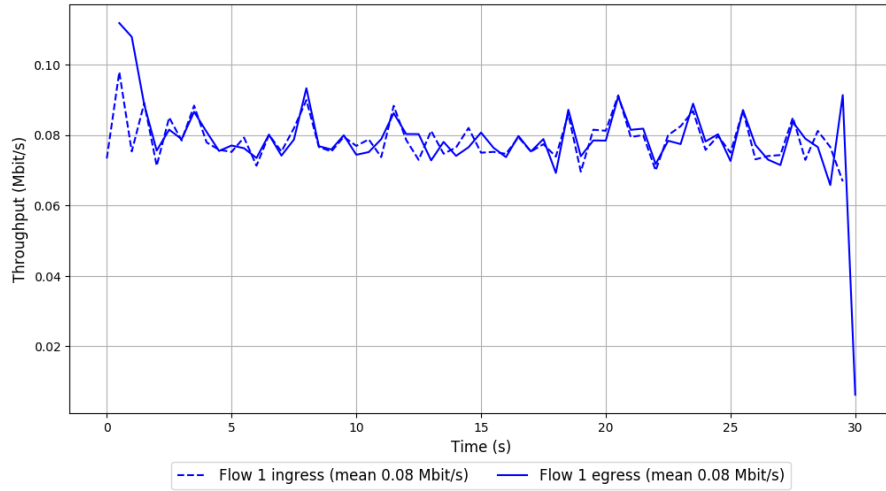


Run 2: Statistics of SCReAM

Start at: 2017-12-20 17:27:53  
End at: 2017-12-20 17:28:23  
Local clock offset: -0.044 ms  
Remote clock offset: 15.738 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 160.758 ms  
Loss rate: 0.13%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 160.758 ms  
Loss rate: 0.13%

## Run 2: Report of SCReAM — Data Link

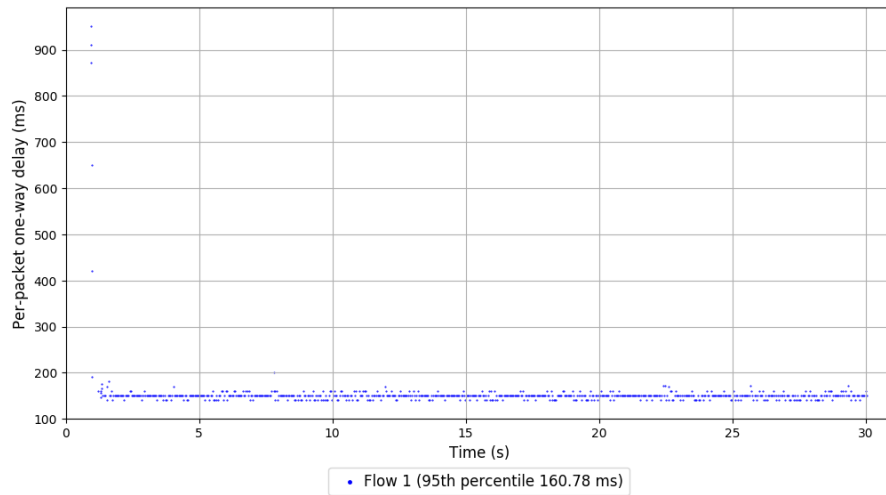
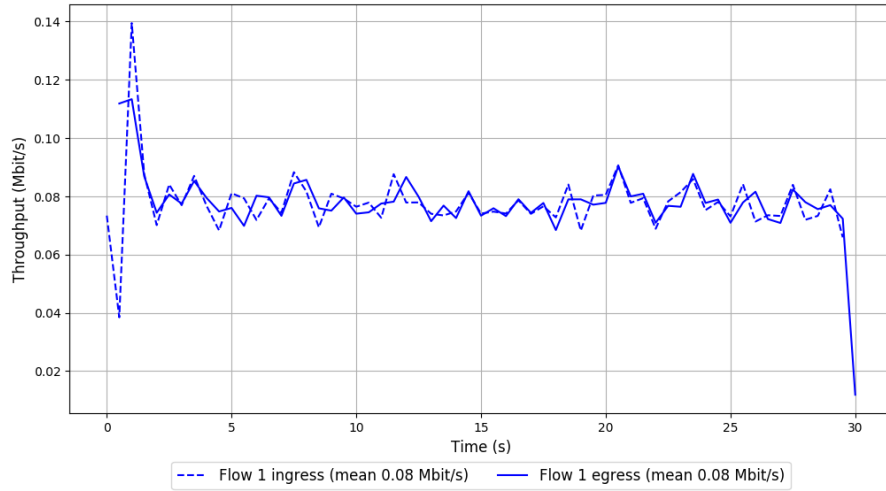


Run 3: Statistics of SCReAM

Start at: 2017-12-20 17:45:31  
End at: 2017-12-20 17:46:01  
Local clock offset: -0.036 ms  
Remote clock offset: 15.709 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 160.782 ms  
Loss rate: 0.13%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 160.782 ms  
Loss rate: 0.13%

### Run 3: Report of SCReAM — Data Link



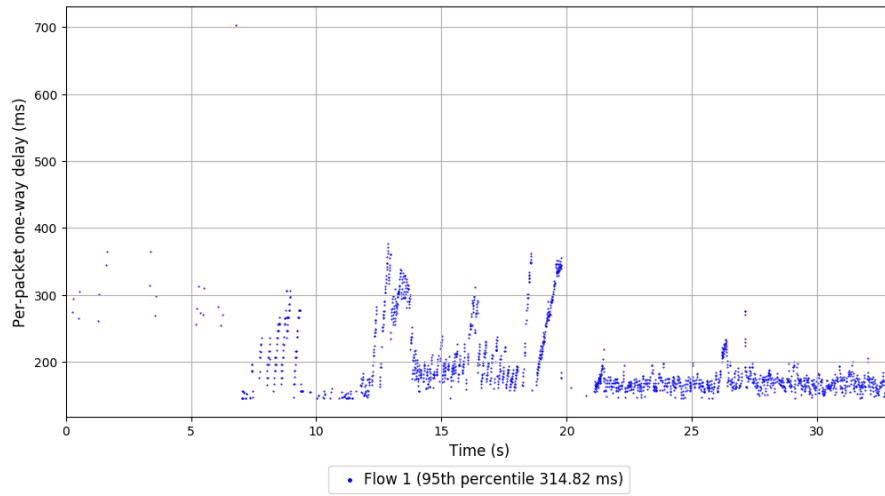
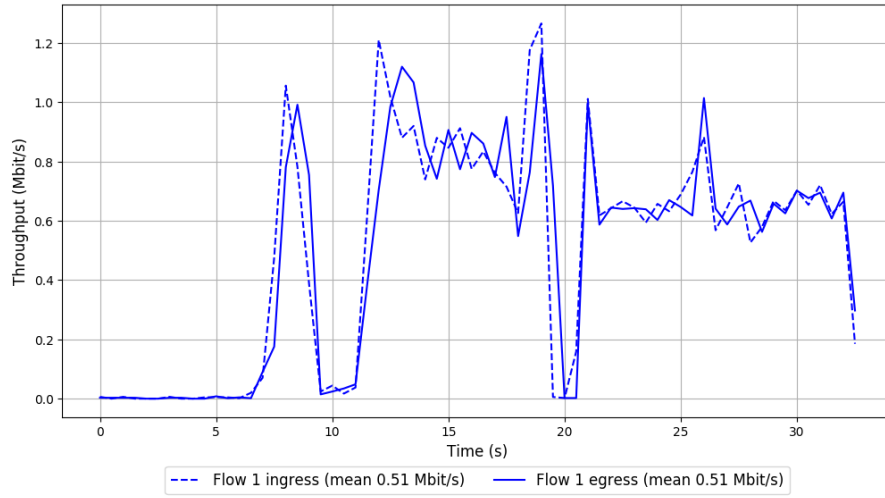
Run 1: Statistics of WebRTC media

Start at: 2017-12-20 16:59:36  
End at: 2017-12-20 17:00:06  
Local clock offset: -0.024 ms  
Remote clock offset: 15.248 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.51 Mbit/s  
95th percentile per-packet one-way delay: 314.816 ms  
Loss rate: 0.29%  
-- Flow 1:  
Average throughput: 0.51 Mbit/s  
95th percentile per-packet one-way delay: 314.816 ms  
Loss rate: 0.29%



Run 1: Report of WebRTC media — Data Link

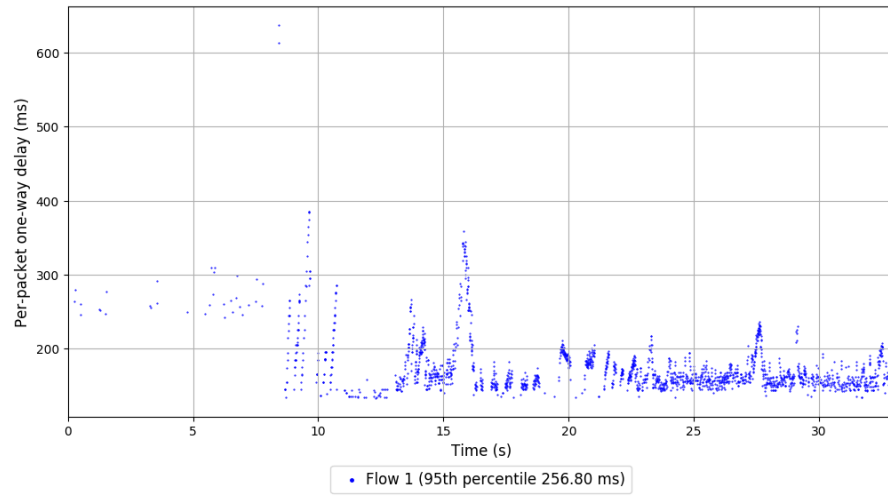
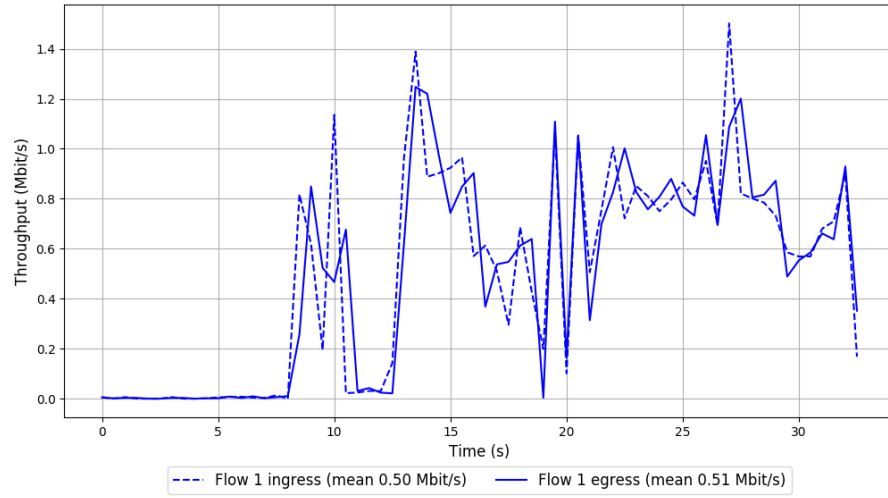


Run 2: Statistics of WebRTC media

Start at: 2017-12-20 17:17:17  
End at: 2017-12-20 17:17:47  
Local clock offset: -0.019 ms  
Remote clock offset: 10.893 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.51 Mbit/s  
95th percentile per-packet one-way delay: 256.795 ms  
Loss rate: 0.22%  
-- Flow 1:  
Average throughput: 0.51 Mbit/s  
95th percentile per-packet one-way delay: 256.795 ms  
Loss rate: 0.22%

## Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2017-12-20 17:34:56

End at: 2017-12-20 17:35:26

Local clock offset: -0.04 ms

Remote clock offset: 15.6 ms

# Below is generated by plot.py at 2017-12-20 17:49:28

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.39 Mbit/s

95th percentile per-packet one-way delay: 398.559 ms

Loss rate: 0.29%

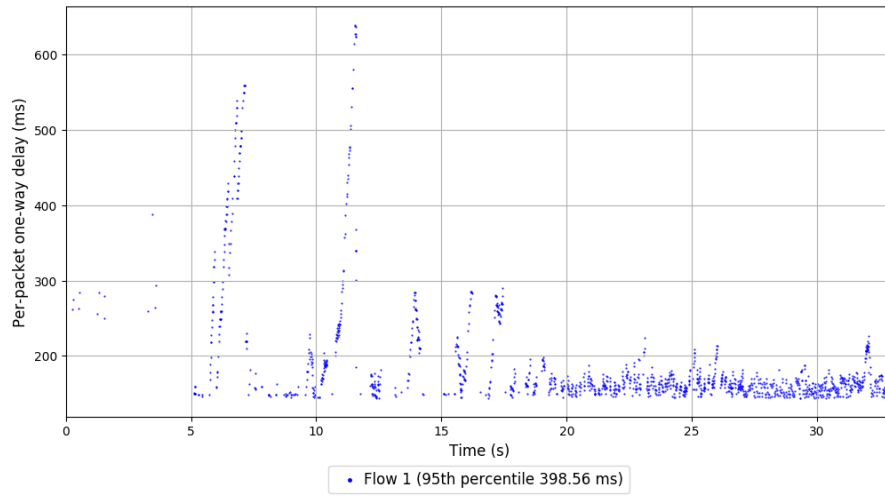
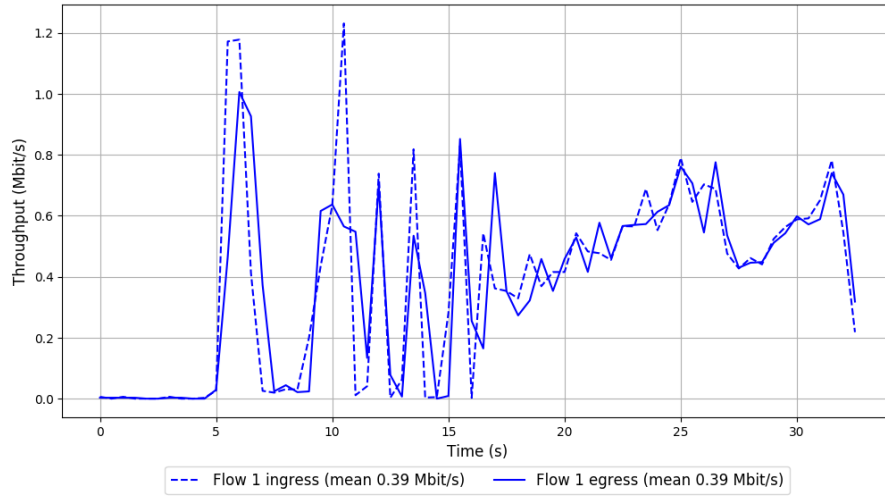
-- Flow 1:

Average throughput: 0.39 Mbit/s

95th percentile per-packet one-way delay: 398.559 ms

Loss rate: 0.29%

### Run 3: Report of WebRTC media — Data Link

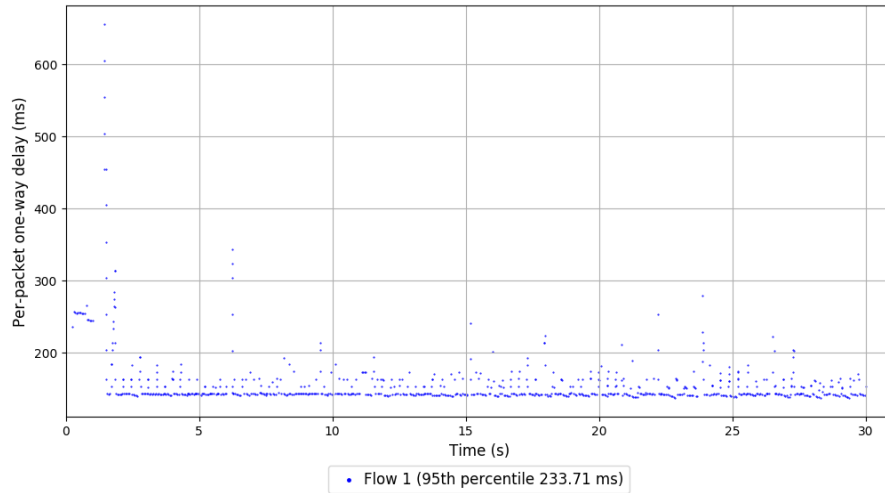
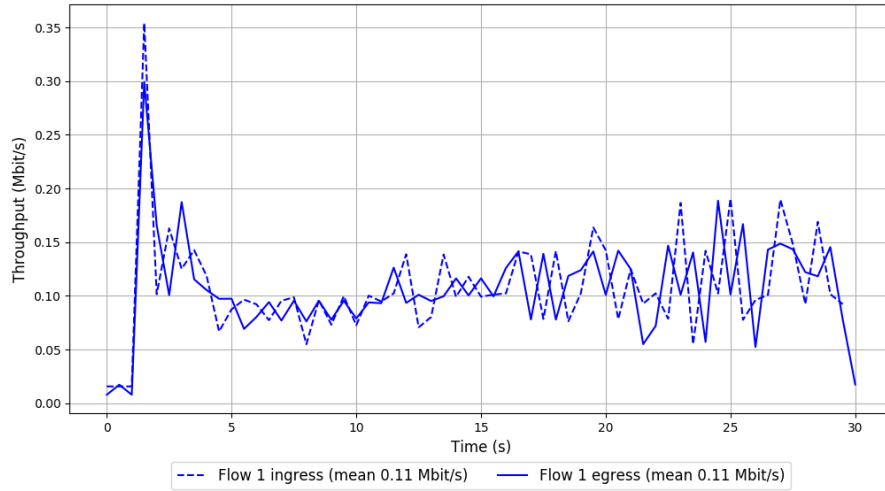


Run 1: Statistics of Sprout

Start at: 2017-12-20 17:01:57  
End at: 2017-12-20 17:02:27  
Local clock offset: -0.087 ms  
Remote clock offset: 10.495 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 233.712 ms  
Loss rate: 0.38%  
-- Flow 1:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 233.712 ms  
Loss rate: 0.38%

# Run 1: Report of Sprout — Data Link



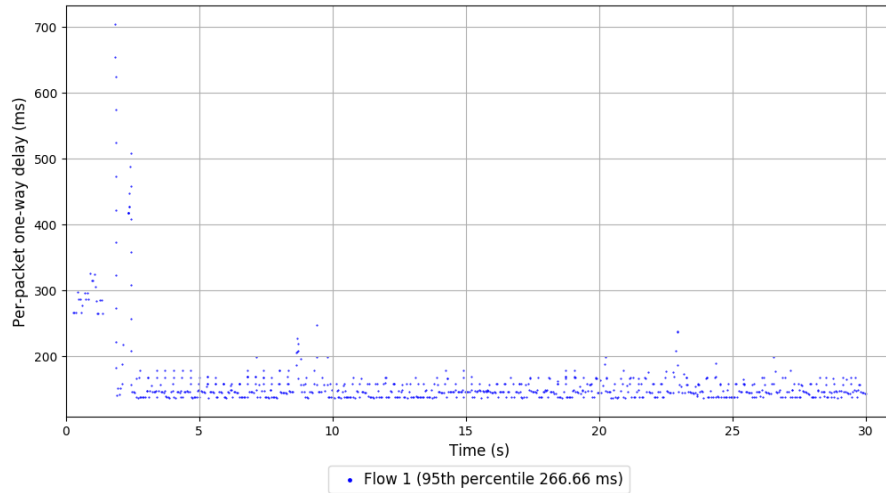
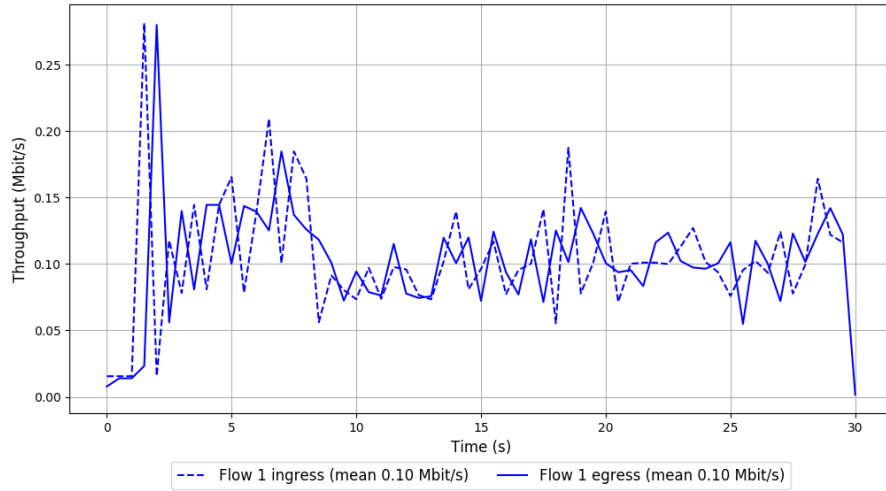
Run 2: Statistics of Sprout

Start at: 2017-12-20 17:19:38  
End at: 2017-12-20 17:20:08  
Local clock offset: -0.029 ms  
Remote clock offset: 10.923 ms

# Below is generated by plot.py at 2017-12-20 17:49:28  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 266.657 ms  
Loss rate: 0.65%  
-- Flow 1:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 266.657 ms  
Loss rate: 0.65%



## Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

Start at: 2017-12-20 17:37:17

End at: 2017-12-20 17:37:47

Local clock offset: -0.05 ms

Remote clock offset: 16.204 ms

# Below is generated by plot.py at 2017-12-20 17:49:28

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 188.565 ms

Loss rate: 0.02%

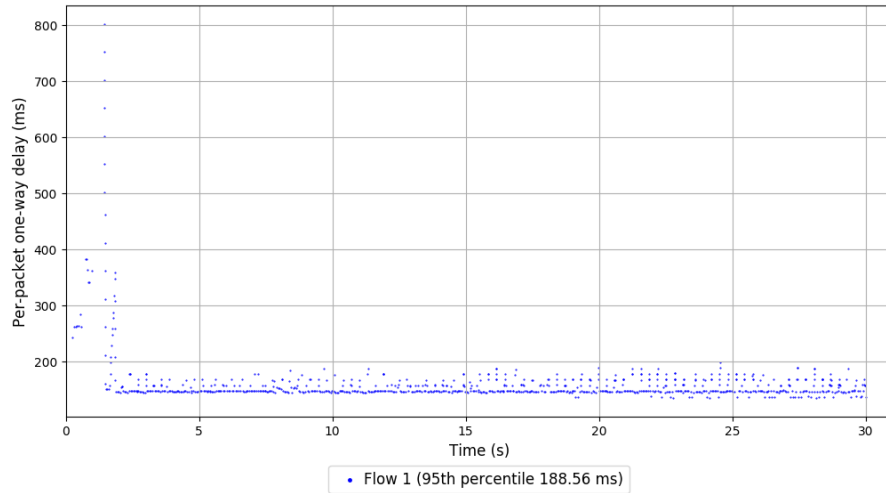
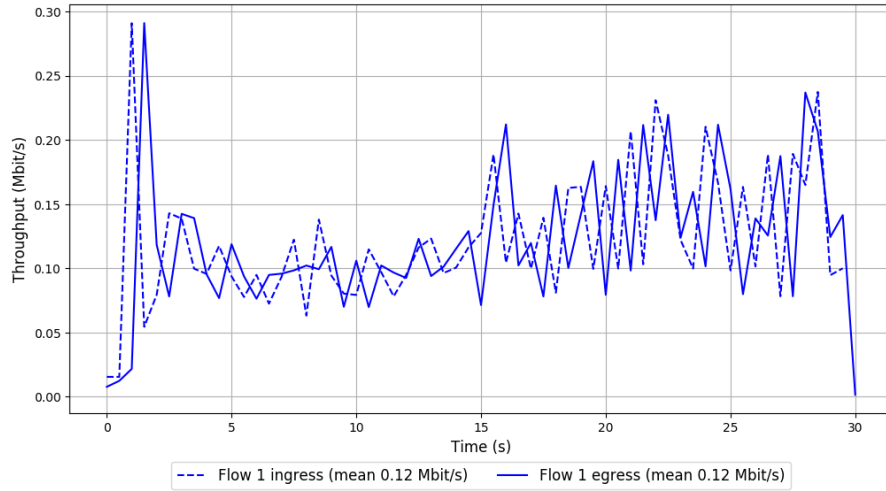
-- Flow 1:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 188.565 ms

Loss rate: 0.02%

### Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2017-12-20 16:57:14

End at: 2017-12-20 16:57:44

Local clock offset: -0.091 ms

Remote clock offset: 9.469 ms

# Below is generated by plot.py at 2017-12-20 17:49:28

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 1596.694 ms

Loss rate: 1.11%

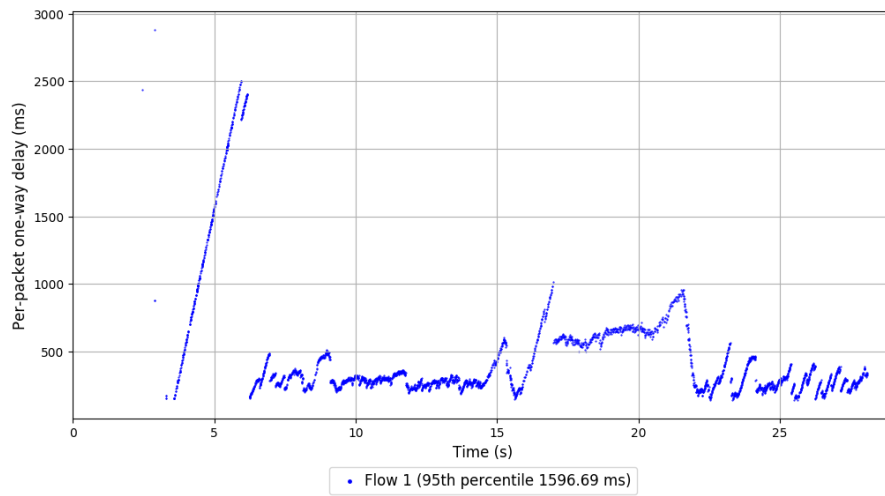
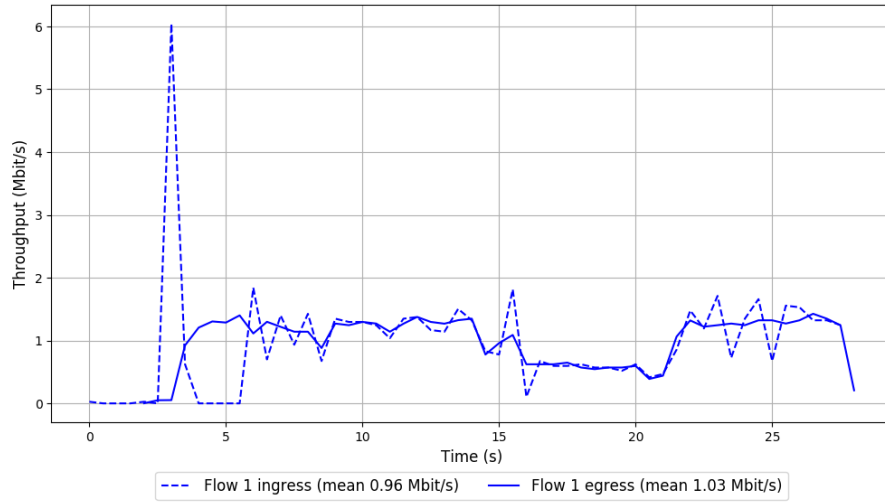
-- Flow 1:

Average throughput: 1.03 Mbit/s

95th percentile per-packet one-way delay: 1596.694 ms

Loss rate: 1.11%

Run 1: Report of TaoVA-100x — Data Link

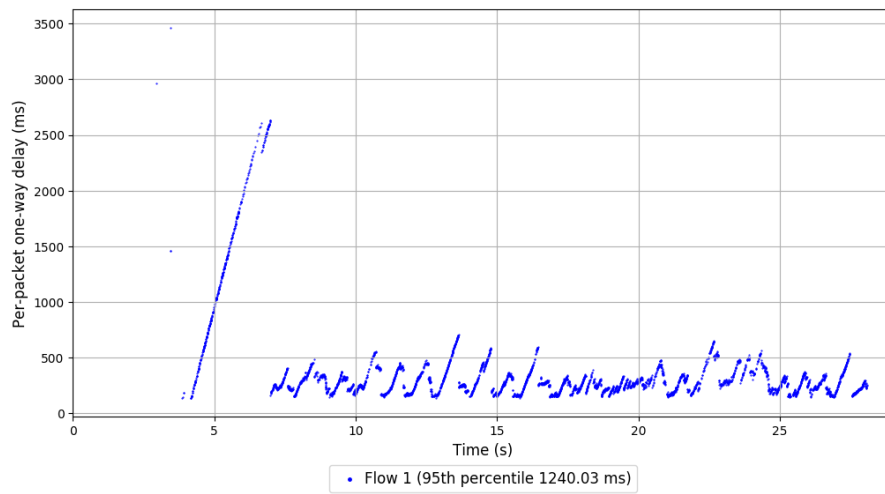
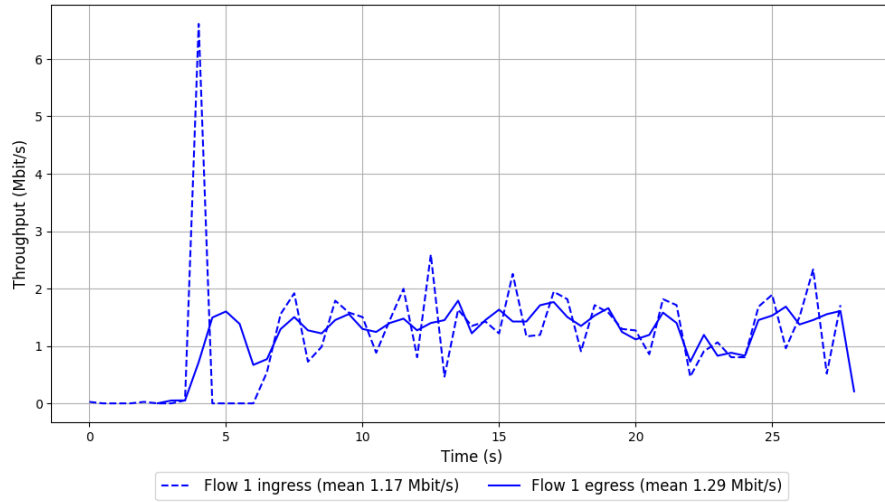


Run 2: Statistics of TaoVA-100x

Start at: 2017-12-20 17:14:56  
End at: 2017-12-20 17:15:26  
Local clock offset: -0.029 ms  
Remote clock offset: 10.903 ms

# Below is generated by plot.py at 2017-12-20 17:49:33  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.29 Mbit/s  
95th percentile per-packet one-way delay: 1240.031 ms  
Loss rate: 0.63%  
-- Flow 1:  
Average throughput: 1.29 Mbit/s  
95th percentile per-packet one-way delay: 1240.031 ms  
Loss rate: 0.63%

Run 2: Report of TaoVA-100x — Data Link



Run 3: Statistics of TaoVA-100x

Start at: 2017-12-20 17:32:34

End at: 2017-12-20 17:33:04

Local clock offset: -0.102 ms

Remote clock offset: 10.799 ms

# Below is generated by plot.py at 2017-12-20 17:49:33

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 556.324 ms

Loss rate: 1.30%

-- Flow 1:

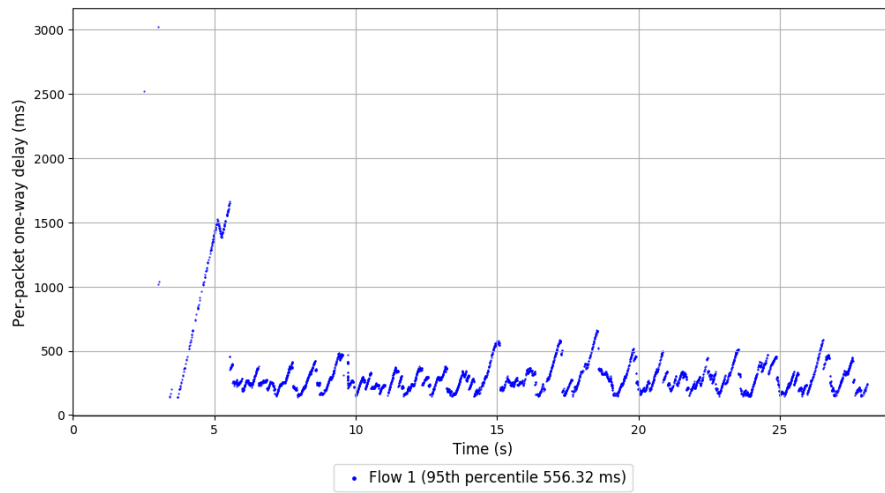
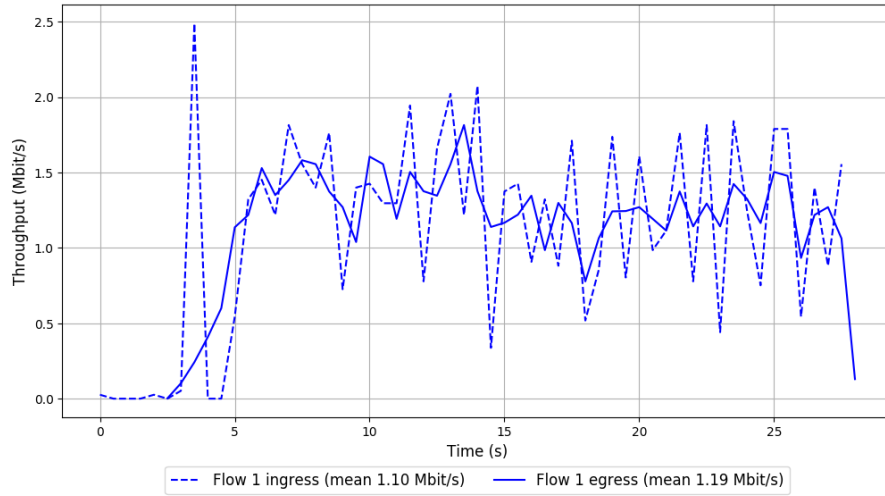
Average throughput: 1.19 Mbit/s

95th percentile per-packet one-way delay: 556.324 ms

Loss rate: 1.30%



### Run 3: Report of TaoVA-100x — Data Link



Run 1: Statistics of TCP Vegas

Start at: 2017-12-20 17:06:40  
End at: 2017-12-20 17:07:10  
Local clock offset: -0.031 ms  
Remote clock offset: 15.355 ms

# Below is generated by plot.py at 2017-12-20 17:49:33

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 456.295 ms

Loss rate: 0.17%

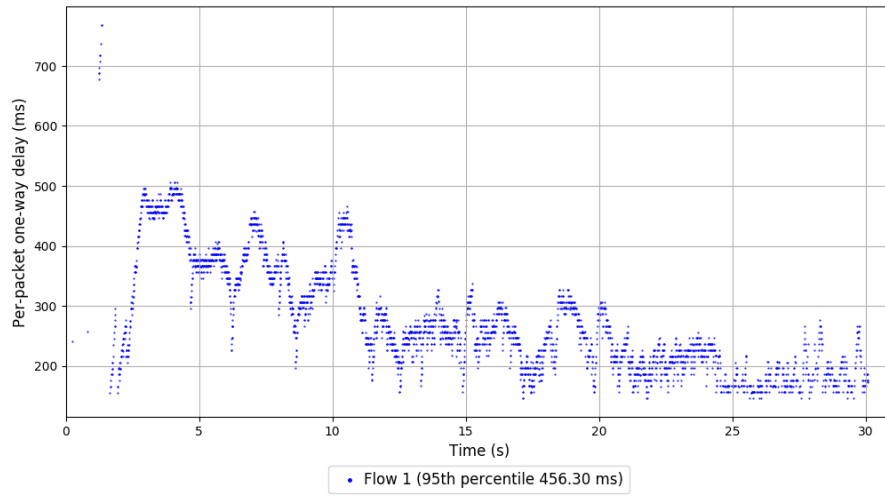
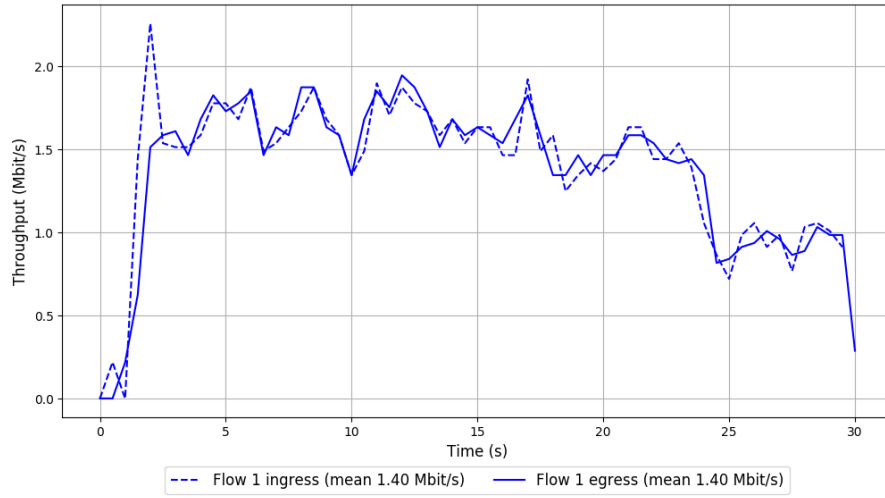
-- Flow 1:

Average throughput: 1.40 Mbit/s

95th percentile per-packet one-way delay: 456.295 ms

Loss rate: 0.17%

Run 1: Report of TCP Vegas — Data Link

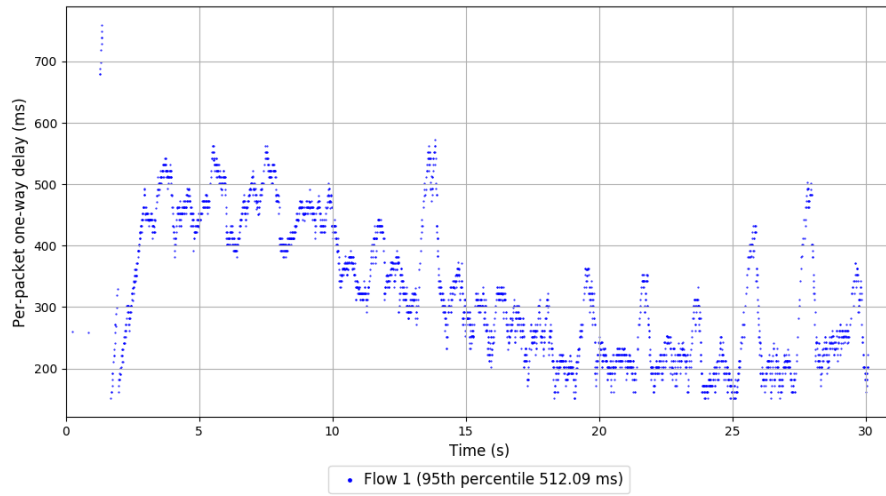
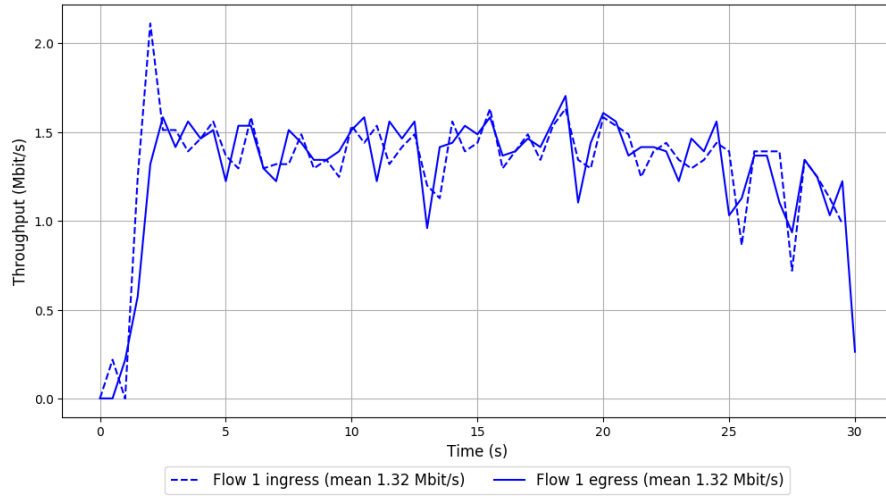


Run 2: Statistics of TCP Vegas

Start at: 2017-12-20 17:24:22  
End at: 2017-12-20 17:24:52  
Local clock offset: -0.029 ms  
Remote clock offset: 14.943 ms

# Below is generated by plot.py at 2017-12-20 17:49:33  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.32 Mbit/s  
95th percentile per-packet one-way delay: 512.086 ms  
Loss rate: 0.30%  
-- Flow 1:  
Average throughput: 1.32 Mbit/s  
95th percentile per-packet one-way delay: 512.086 ms  
Loss rate: 0.30%

## Run 2: Report of TCP Vegas — Data Link

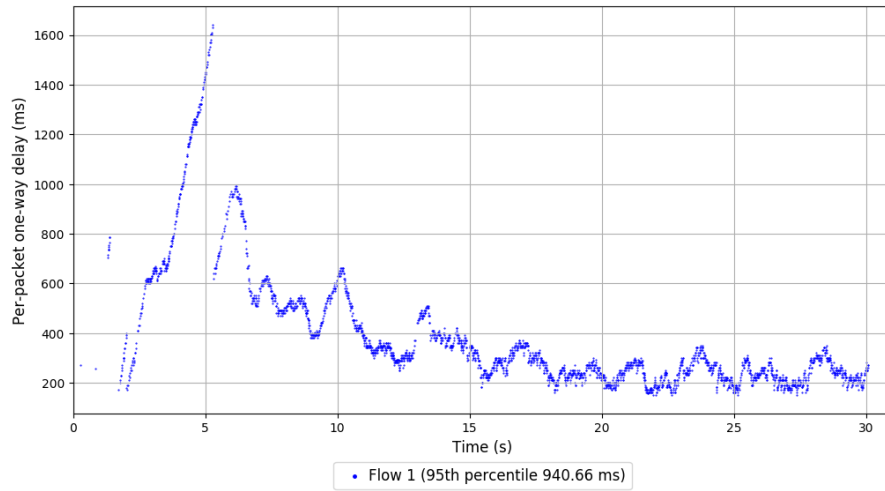
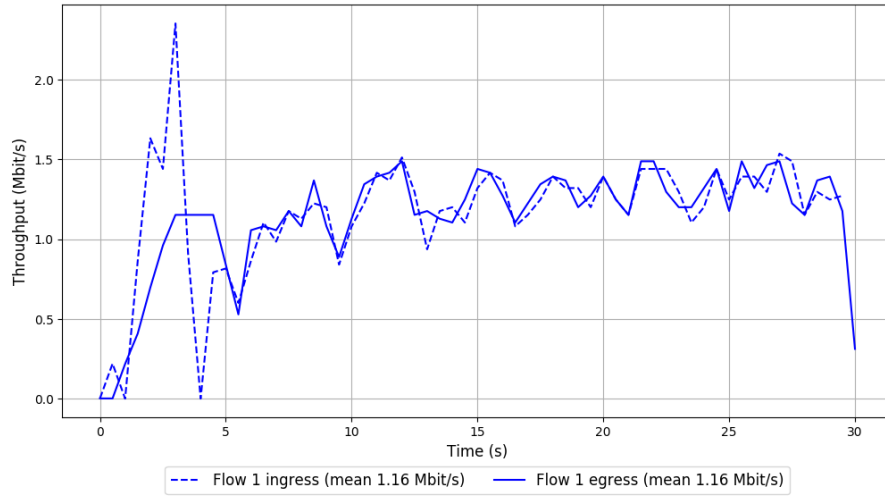


Run 3: Statistics of TCP Vegas

Start at: 2017-12-20 17:42:00  
End at: 2017-12-20 17:42:30  
Local clock offset: -0.09 ms  
Remote clock offset: 16.469 ms

```
# Below is generated by plot.py at 2017-12-20 17:49:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 940.656 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 940.656 ms
Loss rate: 0.45%
```

### Run 3: Report of TCP Vegas — Data Link



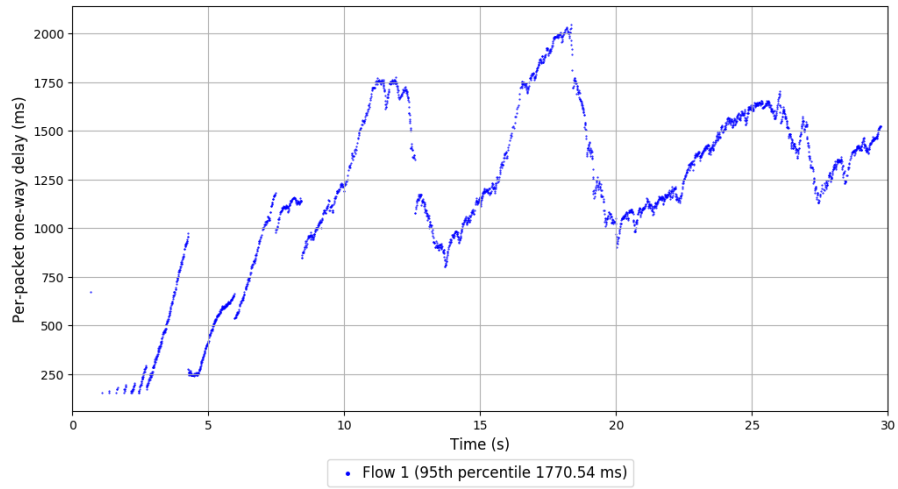
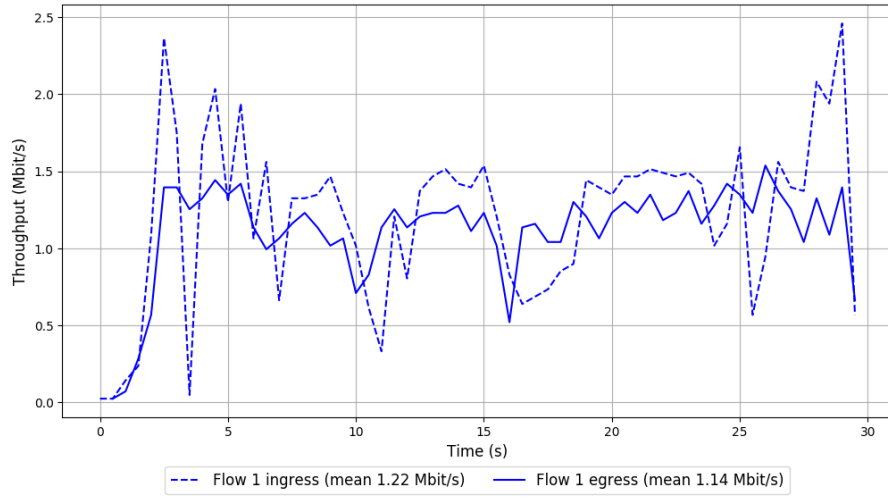
Run 1: Statistics of Verus

Start at: 2017-12-20 17:00:46  
End at: 2017-12-20 17:01:16  
Local clock offset: -0.028 ms  
Remote clock offset: 15.268 ms

```
# Below is generated by plot.py at 2017-12-20 17:49:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 1770.538 ms
Loss rate: 8.56%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 1770.538 ms
Loss rate: 8.56%
```



### Run 1: Report of Verus — Data Link

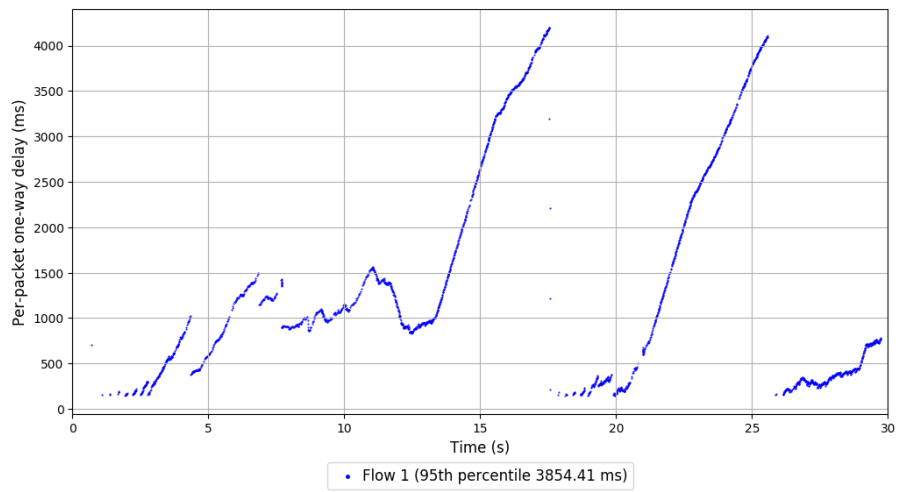
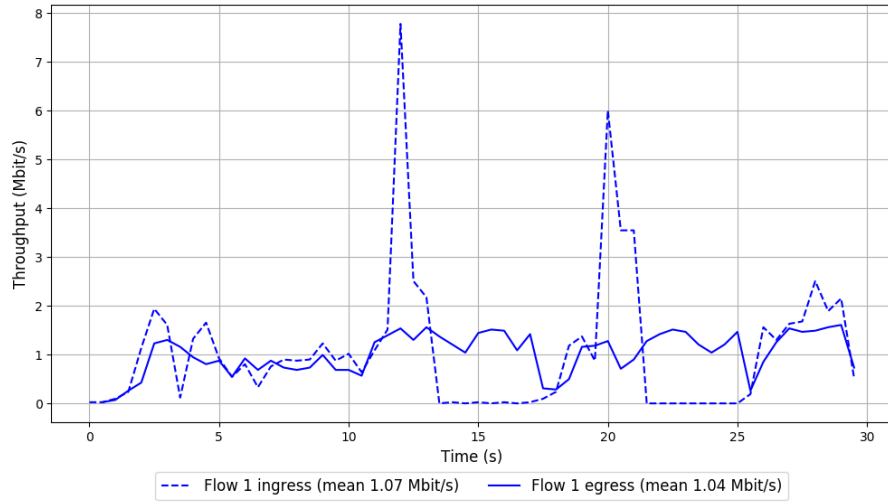


Run 2: Statistics of Verus

Start at: 2017-12-20 17:18:27  
End at: 2017-12-20 17:18:57  
Local clock offset: -0.04 ms  
Remote clock offset: 10.093 ms

# Below is generated by plot.py at 2017-12-20 17:49:34  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.04 Mbit/s  
95th percentile per-packet one-way delay: 3854.407 ms  
Loss rate: 4.59%  
-- Flow 1:  
Average throughput: 1.04 Mbit/s  
95th percentile per-packet one-way delay: 3854.407 ms  
Loss rate: 4.59%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2017-12-20 17:36:06

End at: 2017-12-20 17:36:36

Local clock offset: -0.023 ms

Remote clock offset: 10.32 ms

# Below is generated by plot.py at 2017-12-20 17:49:35

# Datalink statistics

-- Total of 1 flow:

Average throughput: 1.05 Mbit/s

95th percentile per-packet one-way delay: 2256.027 ms

Loss rate: 10.41%

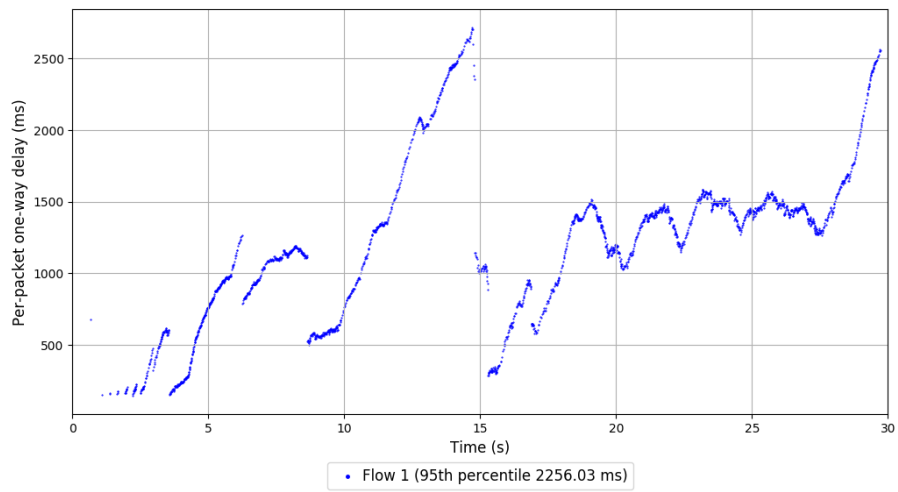
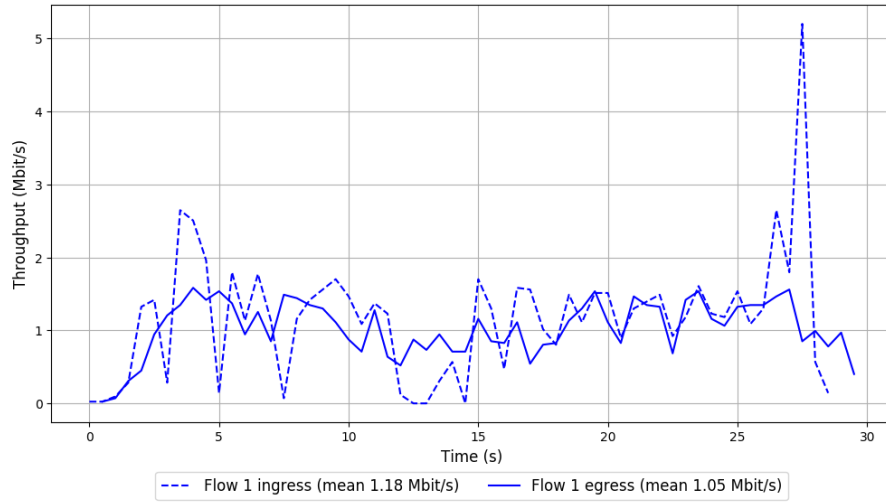
-- Flow 1:

Average throughput: 1.05 Mbit/s

95th percentile per-packet one-way delay: 2256.027 ms

Loss rate: 10.41%

### Run 3: Report of Verus — Data Link



Run 1: Statistics of Copa

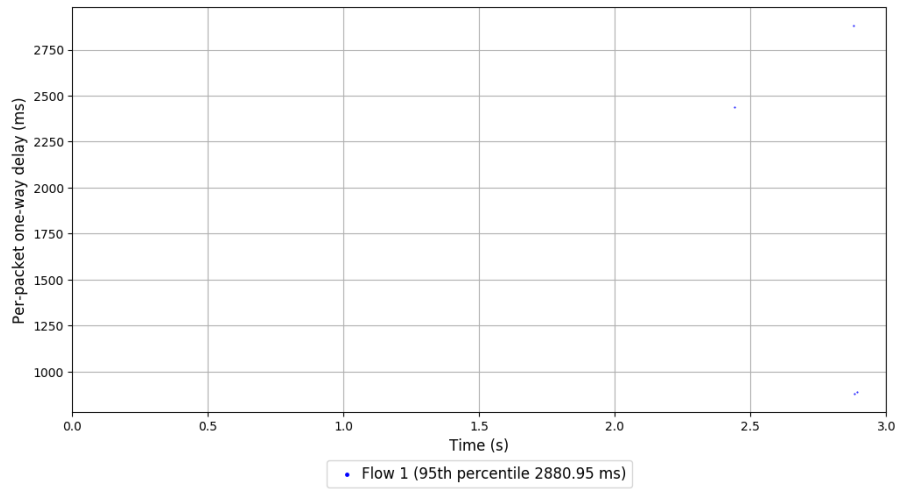
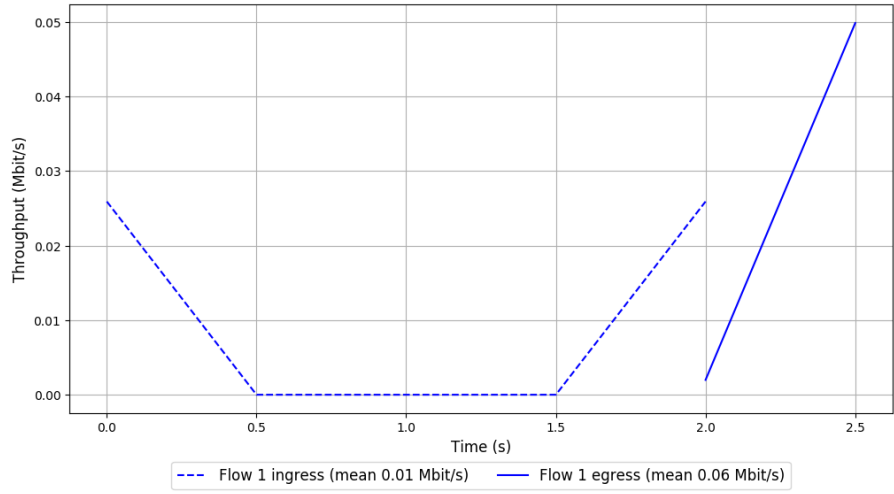
Start at: 2017-12-20 17:04:18

End at: 2017-12-20 17:04:48

Local clock offset: -0.02 ms

Remote clock offset: 9.549 ms

### Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2017-12-20 17:21:59

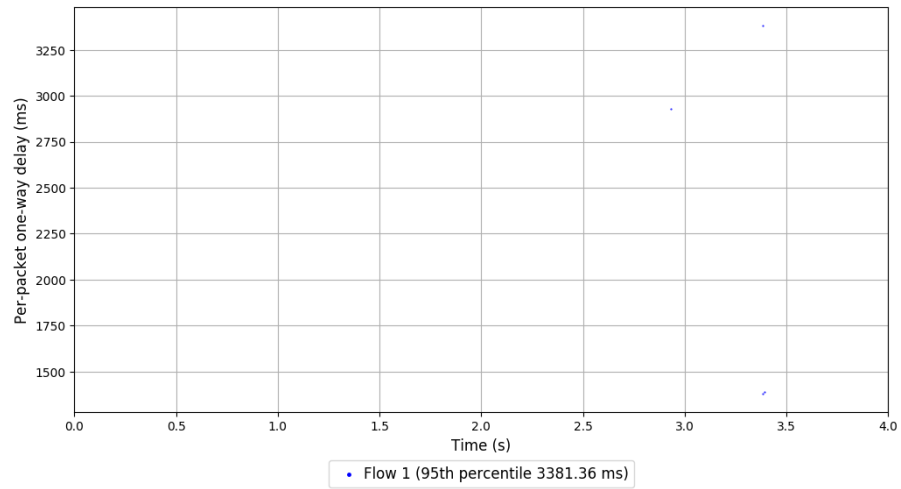
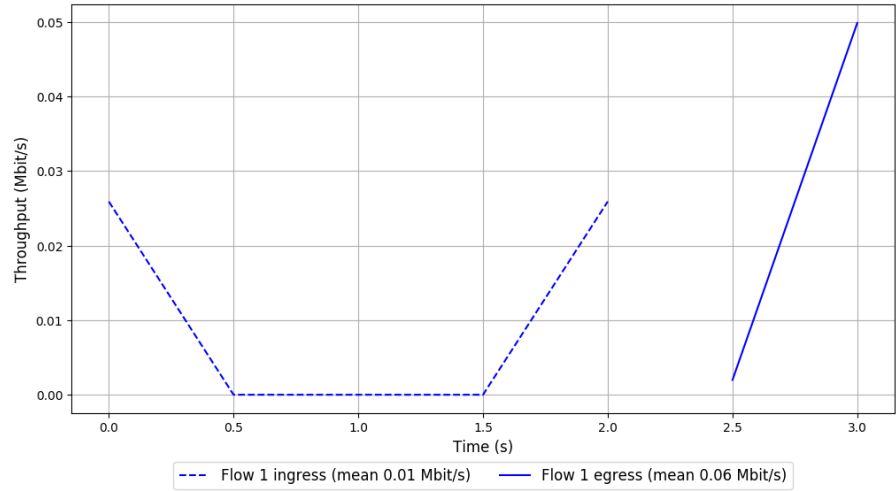
End at: 2017-12-20 17:22:29

Local clock offset: -0.034 ms

Remote clock offset: 10.114 ms



## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

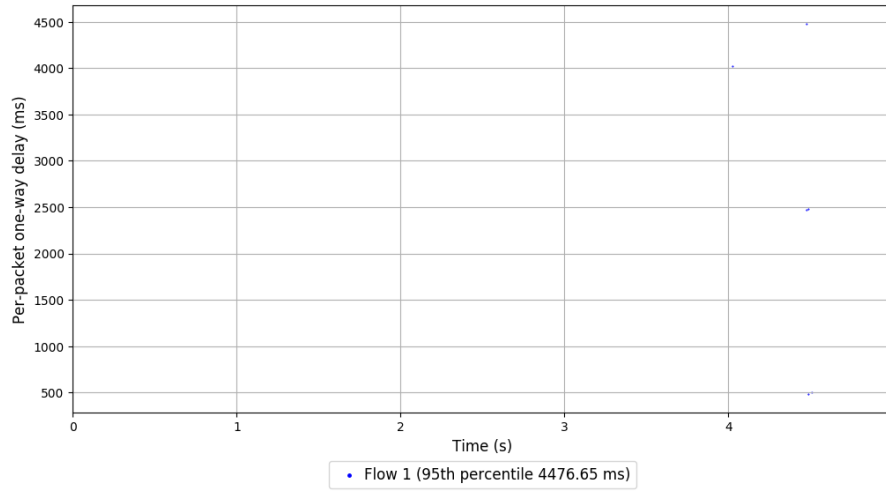
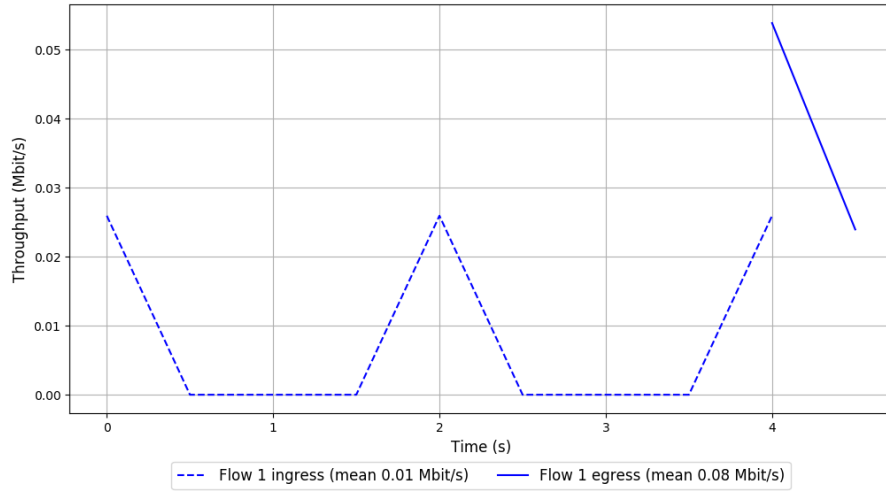
Start at: 2017-12-20 17:39:38

End at: 2017-12-20 17:40:08

Local clock offset: -0.03 ms

Remote clock offset: 15.643 ms

### Run 3: Report of Copa — Data Link

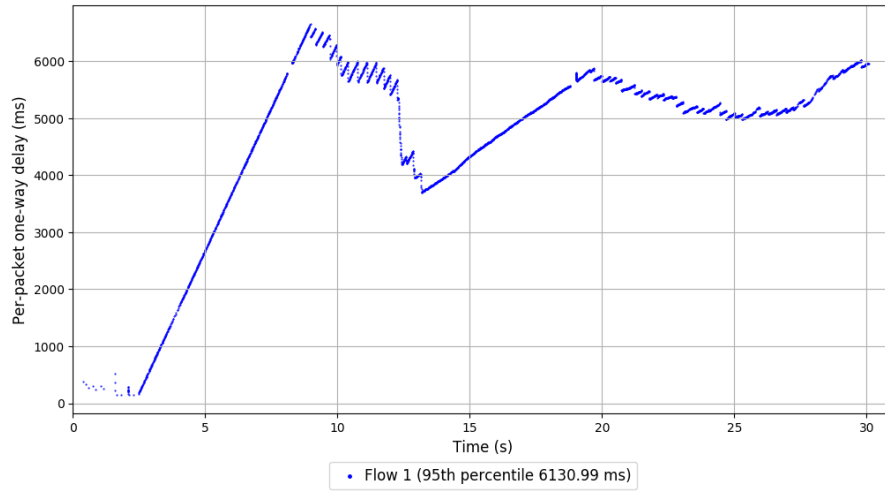
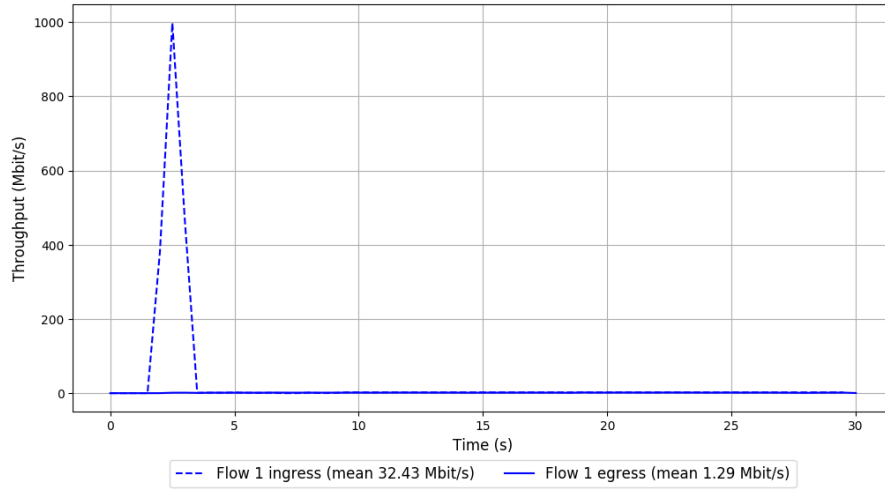


Run 1: Statistics of FillP

Start at: 2017-12-20 17:05:29  
End at: 2017-12-20 17:05:59  
Local clock offset: -0.032 ms  
Remote clock offset: 16.211 ms

# Below is generated by plot.py at 2017-12-20 17:49:40  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 1.29 Mbit/s  
95th percentile per-packet one-way delay: 6130.991 ms  
Loss rate: 96.05%  
-- Flow 1:  
Average throughput: 1.29 Mbit/s  
95th percentile per-packet one-way delay: 6130.991 ms  
Loss rate: 96.05%

### Run 1: Report of FillP — Data Link

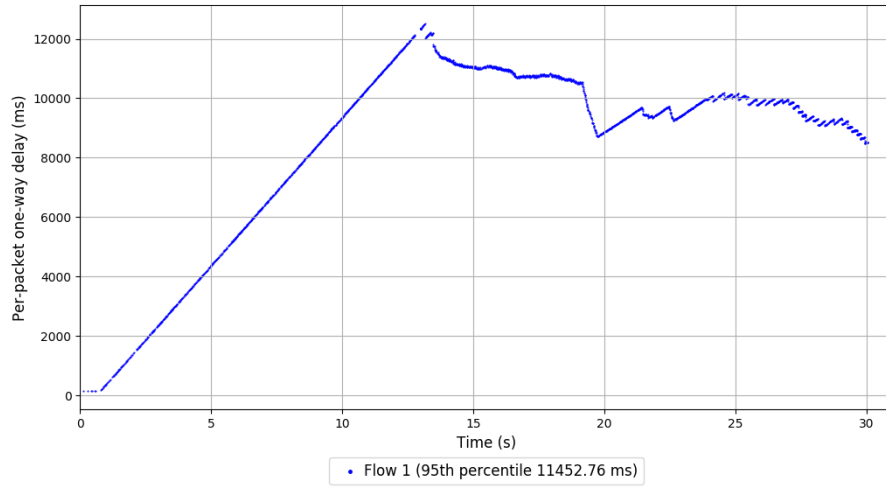
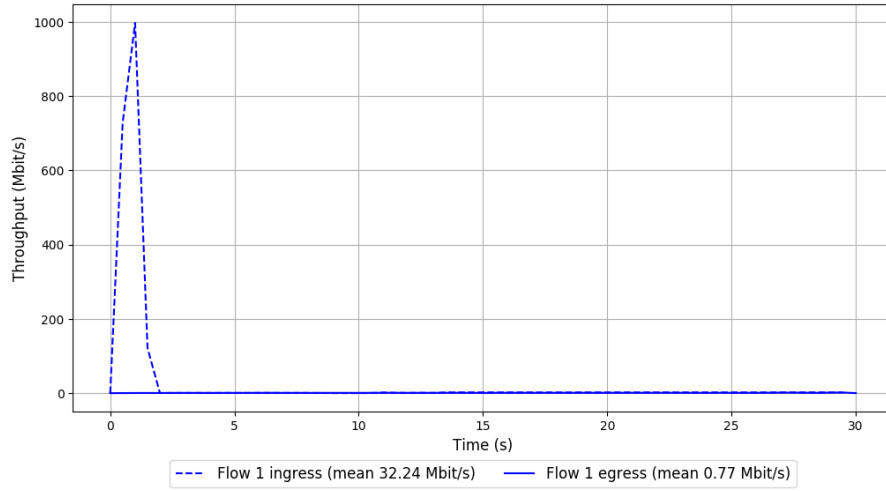


Run 2: Statistics of FillP

Start at: 2017-12-20 17:23:10  
End at: 2017-12-20 17:23:40  
Local clock offset: -0.089 ms  
Remote clock offset: 10.893 ms

# Below is generated by plot.py at 2017-12-20 17:49:40  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.77 Mbit/s  
95th percentile per-packet one-way delay: 11452.765 ms  
Loss rate: 97.62%  
-- Flow 1:  
Average throughput: 0.77 Mbit/s  
95th percentile per-packet one-way delay: 11452.765 ms  
Loss rate: 97.62%

## Run 2: Report of FillP — Data Link



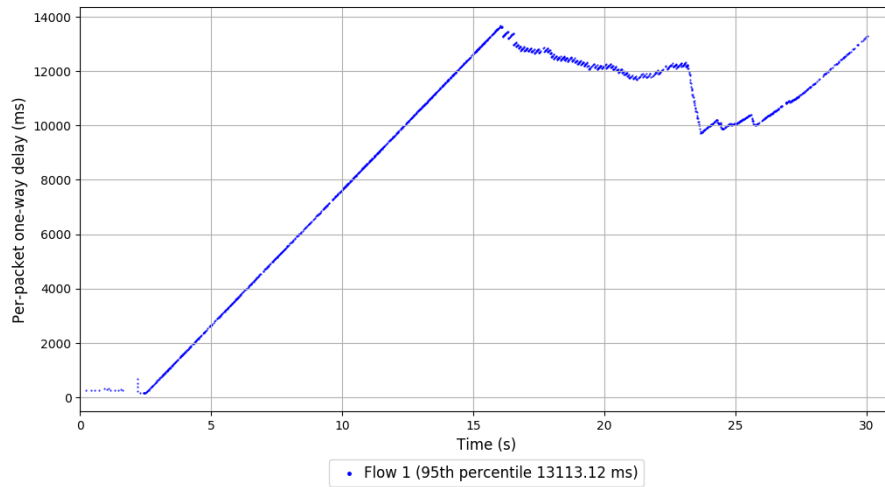
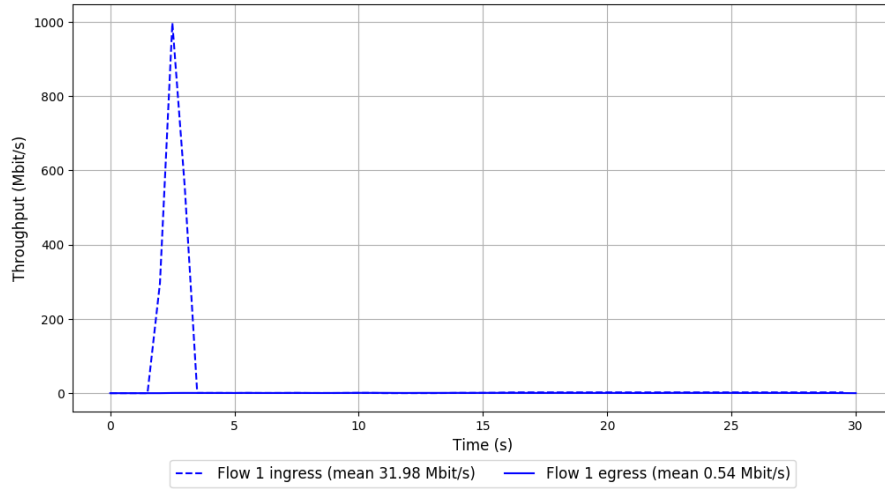
Run 3: Statistics of FillP

Start at: 2017-12-20 17:40:49  
End at: 2017-12-20 17:41:19  
Local clock offset: -0.033 ms  
Remote clock offset: 16.548 ms

# Below is generated by plot.py at 2017-12-20 17:49:40  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.54 Mbit/s  
95th percentile per-packet one-way delay: 13113.123 ms  
Loss rate: 98.32%  
-- Flow 1:  
Average throughput: 0.54 Mbit/s  
95th percentile per-packet one-way delay: 13113.123 ms  
Loss rate: 98.32%



### Run 3: Report of FillP — Data Link



Run 1: Statistics of Indigo

Start at: 2017-12-20 17:07:50

End at: 2017-12-20 17:08:20

Local clock offset: -0.031 ms

Remote clock offset: 9.701 ms

# Below is generated by plot.py at 2017-12-20 17:49:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 427.814 ms

Loss rate: 0.00%

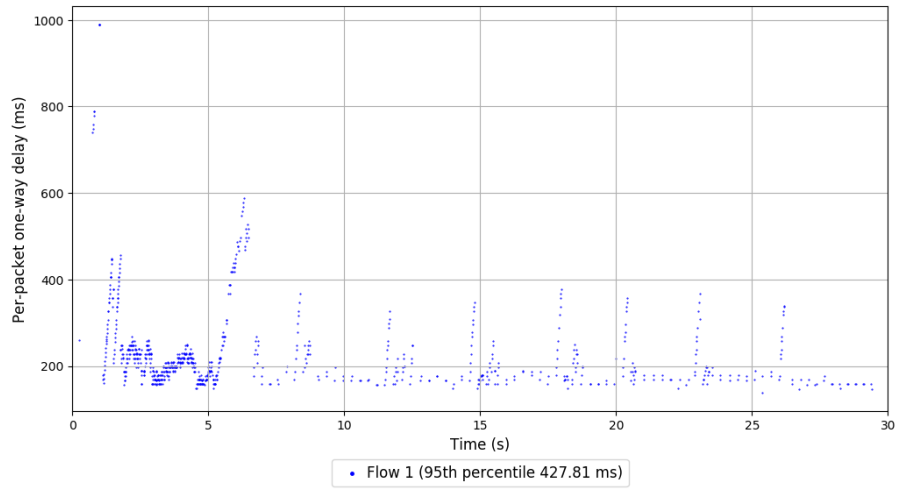
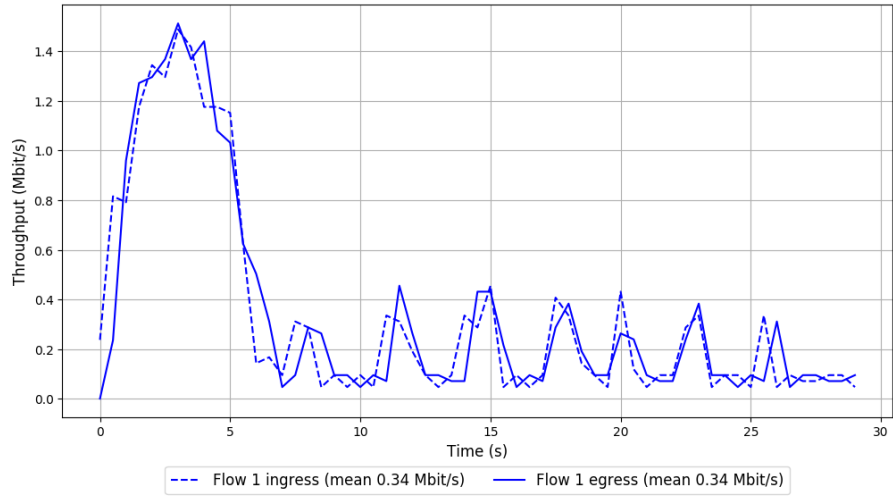
-- Flow 1:

Average throughput: 0.34 Mbit/s

95th percentile per-packet one-way delay: 427.814 ms

Loss rate: 0.00%

# Run 1: Report of Indigo — Data Link

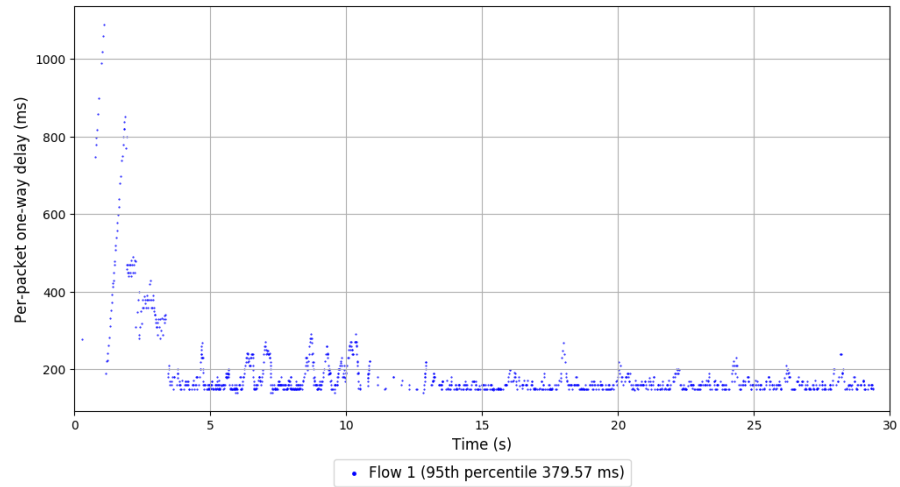
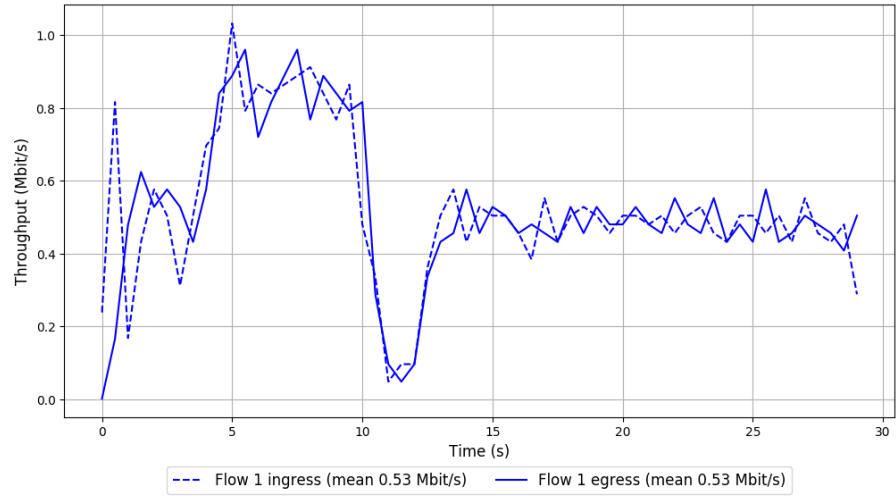


Run 2: Statistics of Indigo

Start at: 2017-12-20 17:25:32  
End at: 2017-12-20 17:26:02  
Local clock offset: -0.016 ms  
Remote clock offset: 10.871 ms

# Below is generated by plot.py at 2017-12-20 17:49:40  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 0.53 Mbit/s  
95th percentile per-packet one-way delay: 379.566 ms  
Loss rate: 0.16%  
-- Flow 1:  
Average throughput: 0.53 Mbit/s  
95th percentile per-packet one-way delay: 379.566 ms  
Loss rate: 0.16%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2017-12-20 17:43:11

End at: 2017-12-20 17:43:41

Local clock offset: -0.107 ms

Remote clock offset: 9.985 ms

# Below is generated by plot.py at 2017-12-20 17:49:40

# Datalink statistics

-- Total of 1 flow:

Average throughput: 0.79 Mbit/s

95th percentile per-packet one-way delay: 230.861 ms

Loss rate: 0.16%

-- Flow 1:

Average throughput: 0.79 Mbit/s

95th percentile per-packet one-way delay: 230.861 ms

Loss rate: 0.16%

### Run 3: Report of Indigo — Data Link

